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ABSTRACT

This curriculum package is designed to prepare students with highly technical information that will lead to success in the animal science field. It contains 19 units that highlight many of the specialist areas and teach students how to apply these skills. The units cover the following topics: safety, careers, private and government programs, selecting and breeding livestock, animal health care, and livestock and poultry marketing and pricing. Each of the instructional units includes some or all of the basic components of a unit of instruction: performance objectives, suggested activities for the instructor, information sheets, student supplements, transparency masters, instructional supplements, activity sheets, job sheets, practical tests, written test, answers to assignment sheets and written test, and Learning Activity Package (LAP) sheets. These components are contained within three packages. An instructor's manual includes the following: measuring student performance gains, criteria for competency-based education, a curriculum, duty, and task crosswalk, a basic skills matrix, one set per unit of the instructor's guide, answers, test code sheets, and instructional supplements for the basic skills sections. The instructor's resource package contains one set per unit of LAP sheets, transparency masters, a written test, handouts, and suggestions for other media. The student workbook contains the objective sheets, information sheets, assignment sheets, and job sheets. All of the units focus on measurable and observable learning outcomes and are designed for use in more than one lesson or class period of instruction. (KC)

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CIMC

Teacher Edition

Oklahoma Department of
Vocational and Technical Education
1500 West Seventh Avenue
Stillwater, OK 74074-4364

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AG-1006

Animal Science

Instructor's Manual

Upfront

Curriculum/Duty Task Crosswalk

Instructor's Guide

Answers

Test Code Sheets

Instructional Supplement

Developed by the
Curriculum and Instructional Materials Center
for the Division of Agricultural Education
Oklahoma Department of Vocational and Technical Education

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Curriculum and Instructional Materials Center

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One set per unit of the following components:

- Instructor's Guide
- Answers
- Test Code Sheets

Instructional Supplement (one set for all units)

Instructor's Resource Package

One set per unit of the following components:

- LAP Sheet
- Transparency Masters
- Written Test
- Other required media

Student Workbook

One set per unit of Objective Sheets, Information Sheets, Assignment Sheets, and Job Sheets for the following units:

SECTION A

Unit 1	Safety	A1-1
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SECTION D

Unit 1	Livestock Price Trends and Cycles	D1-1
Unit 2	Marketing Livestock	D2-1
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Unit 4	Poultry and Exotic Livestock	D4-1

FOREWORD

Agriculture in today's society requires the operator to be highly motivated and to be a specialist both in management and production in order to survive in the competitive world market. Oklahoma's agricultural education programs offer excellent opportunities in many production, management, and entrepreneurship areas. This publication was designed to provide students with highly technical information that will lead to success in the workplace, aid in worksite learning and provide additional skills that will allow that student to be a success in the transition from school to work.

Animal Science contains units which highlight many of the specialist areas in the series entitled, "Agricultural Production and Management." Today's students need to be challenged to not only learn skills, but to realize how these skills apply in the work place. It is hoped that this specialist core of knowledge will serve as a bridge to higher educational levels, greater achievements and higher levels of competencies.

Eddie Smith
State Supervisor
Agricultural Education
and State FFA Advisor

PREFACE

This publication, *Animal Science*, is the first in the Agricultural Production and Management Series. The information contained herein builds upon the materials found in the publications titled Agriculture III and IV and Livestock Skills. Instructors will find a more in-depth treatment of those materials plus information on how to obtain up-to-date supporting materials.

In recent years, the jobs in agriculture receiving spotlight attention have been in processing, sales, and service. Statistics bear out the fact that those industries are where many jobs are to be found. Students seeking jobs in the animal agriculture industry will find that the skills taught in this curriculum will serve them well no matter what segment of the industry they choose.

Randy Kirk
Instructional Development Specialist
Curriculum and Instructional Materials Center

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Randy Kirk
Instructional Development Specialist
Curriculum and Instructional Materials Center

USE OF THIS PUBLICATION

INSTRUCTIONAL UNIT

Each unit of instruction is based on the performance needed for successful employment in an occupational area. *Animal Science* contains nineteen units of instruction. A complete unit may contain most or all of the following components: Objective Sheet, Instructor's Guide, Information Sheet, Instructional Supplement, Assignment Sheet, Job Sheet (and Skill Test Record), Written Test, Answers (to Assignment Sheets and Written Test), Transparency Masters, Learning Activity Package (LAP) Sheet, Handouts, and other required media. These components are organized within three packages, as follows:

Instructor's Manual

- Upfront pages (title page, copyright page, table of contents, foreword, preface, acknowledgments, measuring student performance gains, required criteria for a competency-based education program, and corrections and suggestions)
- Curriculum and Duty/Task Crosswalk
- Basic Skills Matrix
- One set per unit of:
  - Instructor's Guide
  - Answers
  - Test Code Sheets
- Instructional Supplement (one set for all of the basic skills enablers appearing in the book)

Instructor's Resource Package

- One set per unit of:
  - LAP Sheet
  - Transparency Masters
  - Written Test

  ☑ **NOTE:** The three components listed above may be photocopied by the instructor.
- Handouts (as appropriate)
- Other required media (as appropriate)

Student Workbook

- Objective Sheets
- Information Sheets
- Assignment Sheets
- Job Sheets

Instructor's materials include the *Instructor's Manual*, the *Instructor's Resource Package*, and the *Student Workbook*.

Unit components are tied to measurable and observable learning outcomes. Instructor's are encouraged to supplement unit components with other resources to make units as responsive to local conditions and student needs as possible.

Most units of instruction are designed for use in more than one lesson or class period. Instructors should determine the following for each unit:

- amount of material that can be covered in each class period;
- skills that must be demonstrated;
- supplies and equipment needed;
- amount of class time needed for demonstrations;
- amount of class time needed for student practice;
- supplementary materials to be ordered; and
- resource persons who must be contacted.

Objective Sheet (Student Workbook)

The Objective Sheet summarizes each unit for the student and the instructor. The Objective Sheet includes the following sections:

Introduction – This section introduces students to the unit topic and its importance to them. The Introduction also relates the unit to students' experiences and their "need to know"; it helps capture their interest and focus their attention on the specific topic.

Prerequisites – This section is included if any of the units in the book have prerequisites. A prerequisite may be one or more units from the same book or from other books, which must be completed before beginning the unit. (If no prerequisites exist for any of the units in the book, this section is omitted.)

Focus Assignments – Each unit has two Focus Assignments: Prereading and Writing. The Prereading assignment requires the student to read appropriate sections from unit references, from the *Instructor's Resource Package*, or from the student's textbook. The Prereading assignment leads into the Writing assignment, which assigns students a short written activity based on the Prereading assignment. Because the Focus Assignments help promote the use of basic skills, they include appropriate basic skill icons and enablers. (Activities for the basic skills associated with the Focus Assignments are included in the Instructional Supplement in the Instructor's Manual.)

Unit Objective – The Unit Objective states the overall goal of the unit. It identifies what the student will be able to do after successfully completing the unit, as well as the standards used to measure student performance.

Specific Objectives – The Specific Objectives outline the teaching sequence of the competencies required to reach the Unit Objective.

The Specific Objectives on the Objective Sheet should be emphasized to all students at the start of each unit and throughout the teaching/learning process. This will help answer student questions about performance requirements for each unit. Specific Objectives can also assist instructors in determining teaching strategies and instructional methods. Instructors should prepare for each unit by deciding how each objective could best be taught.

Instructors should modify, delete, or add objectives to meet the needs of students and the community. When objectives are added, the instructor should remember to provide the needed information, Assignment and/or Job Sheets, and criterion-referenced test items.

Information Sheet (Student Workbook)

The Information Sheet provides the "must know" content essential for meeting the cognitive objectives in the unit. Information is usually presented in print on the Information Sheet, but may also be presented in other formats, if appropriate, such as on videotape, software, or other media. (Additional formats for presenting the Information Sheet objectives allow this component to be interactive.)

Many objectives on the Information Sheet begin with a "Words You Should Know" section. This boxed item identifies terms relating to the objective, and gives a definition for each. Terms in the "Words You Should Know" boxes are tested only indirectly with the objective information (not on the Written Test as a matching exercise).

The Information Sheet may include clarifying NOTES and EXAMPLES, as needed. In the left column, students and instructors are reminded of the optional and/or required activities and resources available for a particular objective.

Students should read the Information Sheet for each unit before it is discussed in class. Space is provided in the margins for both students and instructors to add notes that clarify and/or expand upon the information presented.

Assignment Sheets (Student Workbook)

The Assignment Sheets address the learning levels at or above the application level of Bloom's taxonomy. They allow students to perform non-psychomotor activities related to occupational tasks. Assignment Sheets also provide students with an opportunity to use higher-order thinking skills, such as problem-solving, synthesizing, analyzing, and evaluating. In addition, they may provide opportunities for cooperative learning and more detailed oral/written communication activities.

Assignment Sheet activities can be "paper and pencil" activities, as well as those using computer software, videotapes, models, handouts, or other resources as appropriate. All Assignment Sheets include basic skills icons and enablers (identified in the left margin).

Job Sheets (Student Workbook)

Job Sheets gives students step-by-step procedures for performing manipulative or psychomotor occupational tasks or jobs. The Job Sheet also functions as a Skill Test Record, facilitating the instructor's evaluation of each student's performance. Both the process and the end-product are evaluated. Diagrams, illustrations, and photographs are included, as needed, to assist students in completing the job.

Individual Job Sheets may include various warnings written to conform to the latest specifications of the American National Standards Institute (ANSI). DANGER is used if the situation *will* lead to death or serious injury if not avoided; WARNING is used if the situation *could* lead to death or serious injury if not avoided; CAUTION is used if the situation could lead to minor or moderate injury; NOTICE is used if the situation could cause property damage only; and IMPORTANT is used to refer to operating or maintenance tips. Each type of warning appears on the Job Sheet with an ANSI symbol.

The instructor should demonstrate the procedure outlined in each Job Sheet. Instructors may also have to localize specific procedures.

Instructor's Guide (Instructor's Manual)

The Instructor's Guide leads instructors step by step, objective by objective through the unit. It recommends instructional strategies for the Focus Assignments and for each of the Specific Objectives. Resources and activities are labeled "R" for "Required" or "O" for "Optional." Optional and Required resources (publications, videos, computer software, and other media) are listed, as well as unit references. These resources can be used to supplement the instructor's knowledge of the subject area and to help students with particular interests or occupational objectives. In addition, the Instructor's Guide provides guidelines for evaluating student performance.

Instructors should study the Instructor's Guide before introducing the unit and allow time to obtain supplemental materials, prepare audiovisual materials, and contact outside resource persons. Specific tasks of the instructor will vary with each unit.

Answers (Instructor's Manual)

This component lists the answers to all of the Assignment Sheets and the Written Test questions.

Test Code Sheet (Instructor's Manual)

The Test Code Sheet matches Written Test questions to objectives. Basic skills codes are listed in chart format for each question. Each unit has a Test Code Sheet. For more information, see the CIMC publication *Measuring Learning & Competency Gains: The Pretest/Posttest Approach.*

Instructional Supplement (Instructor's Manual)

The Instructional Supplement provides the instructor with strategies for teaching the basic skills identified on the Focus Assignments, Assignment Sheets, and Job Sheets. One Instructional Supplement applies to all of the basic skills identified in all of the units of instruction in a book.

LAP Sheet (Instructor's Resource Package)

The LAP (Learning Activity Package) Sheet for each unit allows the instructor to individualize instruction for some or all students. The LAP Sheet guides the student through each unit step by step, ensuring that the student receives the necessary instruction.

Transparency Masters (Instructor's Resource Package)

Transparency Masters are provided so that instructors can make transparencies to accompany specific units. Transparencies allow students to *see* as well as hear the information being presented, thus reinforcing the learning process. They also direct attention to the topic under discussion. Transparencies should be made from the Transparency Masters and placed where they will be readily available when needed. Transparencies should be left on the screen only when the related topics are under discussion.

Each Transparency Master also appears in the appropriate unit in the Student Workbook, at the location where the information is referenced (such as a Figure on the Information Sheet).

Written Test (Instructor's Resource Package)

The Written Test provides criterion-referenced evaluation of the Specific Objectives from the Information Sheet (Assignment Sheet and Job Sheet objectives are not evaluated by the Written Test). If instructors have added, deleted, or modified any objectives, appropriate changes should be made to the Written Test as well.

The Written Test serves as both a pretest and a posttest. In order to measure and document student competency gains as required by the latest Carl Perkins regulations, and as outlined in the Oklahoma-developed system of standards and measures, it is *essential* that the same test be used as a pretest and as a posttest. If instructors choose to use tests other than the Written Test, they should make sure that the same instrument is used for each activity – pre- and posttest.

The Written Test may be photocopied for classroom use, or additional copies may be ordered from the CIMC by calling 1-800-654-4502, or (in Oklahoma) 1-800-522-5810, ext. 589.

A detailed explanation of the Oklahoma plan for standards and measures and the Carl Perkins requirements is included in the CIMC publication *Measuring Learning & Competency Gains: The Pretest/Posttest Approach.* This booklet – and accompanying software to assist in calculating and recording student gains – are available to Oklahoma instructors through their school's vocational testing liaison.

To further assist instructors, the CIMC develops Test Code Sheets for each Written Test in its more recent publications, including this one. (These sheets are explained in detail in the publication mentioned above.) The Test Code Sheets assist in verifying that the Written Test is a valid instrument for measuring student learning and competency gains.

COMPETENCY PROFILES

A Competency Profile is available from the CIMC. Competency Profiles document student performance. Each profile lists the specific competencies covered in the book, and provides space for recording the student's level of performance on each competency.

PAGE NUMBERING

Each unit and each page in a CIMC publication has a number, shown in arabic numerals. The page number gives the package title, the book title, the component name, the unit number, and the page number within the unit. For example, the page number for page 1 in Unit 6 of the *Student Workbook* would appear as follows:

STUDENT WORKBOOK – Animal Science
OBJECTIVE SHEET · **CIMC** · 6 · 1

METHODS OF DISSEMINATING MATERIAL

For best results, provide each student with a copy of the Student Workbook. Students should be allowed to keep their Workbooks at the end of the course or training program.

TEACHING METHODS

Keeping students motivated is a challenge. Supplement each unit with current information, personal experiences, and other information. In a group setting, prepare for each unit by determining the best way to teach each objective, and allow for student input. For individualized instruction, provide opportunities for the student to become involved in planning and being responsible for his or her own education.

BASIC SKILLS IN CURRICULUM

The CIMC has always been mindful of the importance of reinforcement (and sometimes remediation) of students' academic skills as they progress through vocational training, and has always included activities in its materials to enhance and promote use of these skills.

Recent state and federal legislation mandates vigorous basic skills development in vocational education in the wake of demands by industry that workers *must* be academically, as well as technically, competent, given the nature of the highly complex work place. In response, the CIMC has taken the following steps to document that, indeed, the instructional materials *do* combine academic skills training with the vocational training. In addition, concerted efforts have been made to "beef up," or enhance the basic skills instruction already present. Following is a brief description of those processes:

Basic Skills Icons and Enablers

To assist teachers and students in identifying activities that promote basic skills development, the CIMC has implemented a marking system that uses simple graphic symbols, or icons, and a list of specific tasks, or enablers, to identify the basic skill or skills that are called for in each job or assignment sheet.

Each of the nine broad skills areas—reading, writing, mathematics, science, oral communication, interpersonal or relating, creative thinking and problem solving, employability, and social studies—is represented by the icon presented below.

Reading

Science

Creative Thinking/ Problem Solving

Writing

Oral Communication

Employability

Math

Interpersonal or Relating

Social Studies

When an activity involving one of these basic skills is identified, the corresponding icon is placed in the left-hand margin of the job or assignment sheet. The basic skills training is further defined by retrieving the specific, or enabling, skill that is required by consulting a list of over two hundred and fifty enablers that has been compiled and grouped with each general basic skill. This enabling skill is placed directly below the icon.

As an example, an exercise that requires a student to conduct library research would make necessary the use of specific reading comprehension and research and reference skills. The basic skills that the exercise promotes would be depicted in the left-hand margin as follows:

ASSIGNMENT SHEET

PLANNING LIVING SPACE FOR HUMAN NEEDS 1

Name _____ Score _____

OBJECTIVE 10

Define personal territory.

INSTRUCTIONS

Reading Comprehension
- Gain factual information

Functional Reading
- Follow written instructions
- Use content area vocabulary

Language
- Use standard grammar, spelling, and capitalization
- State ideas clearly

- As discussed in Objective 1, each person has an invisible "space bubble" or comfort zone. A comfort zone is the space between oneself and others that brings a feeling of well-being. When one's comfort zone is crowded or invaded, discomfort often results. Therefore, personal territory needs should be a prime consideration when planning living space.
- For each of the following situations, draw your estimated comfort zone around the figures provided.
- Indicate how many inches from your body the comfort zone extends.
- Consider how that comfort zone changes in different situations. Answer the questions that follow.

Basic Skills Documentation Matrix

Another component of the CIMC basic skills instructional plan is the "Basic Skills Documentation Matrix." The matrix graphically summarizes the basic skills training included in the vocational program, unit by unit. It should be helpful to teachers in planning their instruction, and to administrators as documentation that basic skills **are** being addressed during the vocational training.

The matrix for this publication is included as an 8½" by 11" foldout in this *Instructor's Manual.*

Matrices have been developed for most CIMC publications. For more information on those available for other programs, call the CIMC at 1-800-654-4502.

Instructional Supplement

The supplement is a tool for the instructor to use in helping students apply the basic skills in Assignment Sheets and Job Sheets. Some supplements are appropriate for use with all students; some are for use only with those students who do not understand the academic skills called for in the exercise.

MEASURING STUDENT PERFORMANCE GAINS

When you examine this book, you will notice that separate written pretests are no longer included in the units of instruction. Each CIMC unit now contains only a single Written Test. This test should be used as **both** pretest and posttest by giving it once before students start a unit and again when they have completed the unit.

The reason for using a single instrument as both pretest and posttest is so that direct comparison of each student's competencies before and after instruction can be made accurately. This comparison enables precise calculation, documentation, and evaluation of student **performance gains**.

Accurate performance gains analysis is an important requirement of the new Carl Perkins legislation for vocational education. Teachers can make an important contribution to the performance accountability mandated by the new federal legislation by carrying out accurate performance gains analysis for their students, and making this data available to students, parents, and administrators.

This analysis is easy to do and requires only simple calculations and record keeping. Detailed information regarding performance gains analysis is contained in the CIMC publication, *Measuring Learning & Competency Gains: The Pretest/Posttest Approach.* In addition, the CIMC has developed a computer program, CARL, which will perform all necessary calculations and will print out a record form of all information required for gain score analysis. Copies of CARL and the publication are available through your local testing liaison (in Oklahoma), or from the CIMC at 1-800-654-4502.

REQUIRED CRITERIA FOR A COMPETENCY-BASED EDUCATION PROGRAM

Criterion	Discussion	CIMC component meeting criterion
1. Instruction is based on clearly-stated learning objectives that are: a) observable and measurable, and b) communicated in writing to students before instruction begins.	Learning objectives drive CBE. Objectives are the "competencies" that learners must achieve. Each objective must clearly state what *learners* must *do* to demonstrate acquired skill or knowledge. Verbs in learning objectives are active and precise, stating the exact performance expected of learners. The objectives should also specify the standard or level of performance required. Objectives can be at any level of Bloom's Taxonomy and can include the cognitive, psychomotor, and affective domains. Higher-order cognitive skills should be included.	Objective Sheet
2. Instruction is aligned with the stated learning objectives	In CBE, the objectives specify what is taught. "Content" should relate to one or more objectives. The curriculum should cover all objectives with relevant information.	Information Sheet
3. There is a student evaluation system that is: a) criterion-referenced, and b) aligned to the learning objectives and the curriculum.	In CBE, the aim is to bring the performance of *all* learners up to a pre-defined standards and competencies. Learners work on each competency until they achieve "mastery"; the evaluation system should test and record this mastery. Learners can restudy and retest as often as needed. Specific remediation activities should also be available to learners when needed. The evaluation system focuses on what each student has achieved, not on what the instructor has "taught." The "constant" in CBE is student performance; the "variables" are time and resources. (This differs from traditional systems where learners get one chance at mastery; some succeed and some fail. In such systems, time and resources are constant and student achievement is variable.) If an evaluation is criterion-referenced, successful learner performance is defined by (or *referenced* to) mastery of pre-set objectives and standards (or *criteria*): there must be a careful match (or *alignment*) between what the student should master (objectives), what is taught (curriculum), and what is tested. Objectives, curriculum, and evaluation system must all match.	Written Test and Job Sheet/Skill Test

Criterion	Discussion	CIMC component meeting criterion
4. There is an observable management system of cognitive skill practice that provides for, promotes, and documents mastery learning.	For both cognitive and psychomotor skills, a CBE program must have a system of maintaining records of which skills and activities each learner has completed, which ones are in progress, and which ones have not yet been completed. Completion means "mastery"; no skill is completed until the learner has achieved the mastery level. The record system should promote feedback on student skill attainment to *both* instructor and learners, provide for remediation as needed, and encourage reevaluation of learner performance until mastery is achieved. Appropriate remediation strategies often should consider learning styles and other individual differences among learners. Learners should work on skills and activities until they achieve mastery. They should not be "passed on" without mastery. While learners may move ahead and work on other skills (i.e those for which all prerequisite skills have been mastered or those without prerequisites), work should also continue on the skills still requiring mastery. Students should not attempt higher-order skills until all prerequisite skills are mastered.	Assignment Sheet
5. There is an observable management system of psychomotor skill practice that provides for, promotes, and documents mastery learning.		Job Sheet/Skill Test
6. Skill mastery records are maintained for each learner, and learners have access to and make use of these records to monitor their skill acquisition.	Records should clearly indicate the skills each learner has mastered. One such record should profile or list the competencies that have been mastered and those to be mastered. Other performance indicators can be added and kept in a portfolio for each learner. Learners should have ready access to their portfolios to monitor their own progress in skill mastery and competency attainment.	Competency Profile

CORRECTIONS AND SUGGESTIONS

The Curriculum and Instructional Materials Center (CIMC) wants to provide vocational instructors and students with accurate and effective materials. Although the CIMC strives to maintain the highest standards of development and production, oversights sometimes do occur. If you find any errors in this or other CIMC publications, or have suggestions for improving their usefulness in vocational programs, please notify the CIMC staff. To do this, please identify the page(s) affected and write any comments to clarify the error or suggestion. Use the spaces below. Then, simply fold (bottom of page *upward*, top *downward*), secure, and mail.

This information will be used to correct the publication before the materials are reprinted. To ensure that the material is updated on a timely basis, notify the CIMC of necessary corrections as soon as possible after discovering the error.

[2] Fold downward

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VOCATIONAL AND TECHNICAL EDUCATION/CIMC
1500 W. 7TH AVE
STILLWATER OK 74074-9907

CROSSWALK

OCCUPATION: Farmer/Rancher

Animal Science Section

NO.	TASK	CIMC UNIT/ COMPONENT
J	**Breed Livestock**	
J.01	Select animals for desirable breeding characteristics	Agriculture II
J.02	Analyze Expected Progeny Differences (EPD) records and performance records	Section B, Unit 1, Assignment Sheet 4
J.03	Assist with birth	Section B, Unit 5, Job Sheets 1, 2 & 3
J.04	Test for fertility	Section B, Unit 4, Job Sheet 1
J.05	Select mating methods	Section B, Unit 1, Assignment Sheet 6
J.06	Test for pregnancy	Section B, Unit 4, Job Sheet 1, Handout 1
J.07	Artificially inseminate animals	Section B, Unit 3, Job Sheet 1
J.08	Identify signs of estrus	Section B, Unit 1, Assignment Sheet 7, 8
K	**PROVIDE BALANCED NUTRITION**	
K.01	Apply proper feed storage and handling practices	Section C, Unit 3, Assignment Sheet 4
K.02	Select feed supplements and additives	Section C, Unit 3, Assignment Sheets 2 & 3
K.03	Compare composition of feed ingredients	Section C, Unit 3, Assignment Sheet 2
K.04	Analyze farm grown forages and grains	Crop Science
K.05	Determine proper nutrient and water requirements for various stages of production	Section C, Unit 3, Assignment Sheet 8
K.06	Identify pasture requirements and develop a grazing schedule	Section C, Unit 3, Assignment Sheet 9

K.07	Formulate balanced rations	Section C, Unit 3, Assignment Sheets 5, 6, 7, & 8
L	**MAINTAIN ANIMAL HEALTH**	
L.01	Evaluate livestock handling facilities	Section A, Unit 1, Assignment Sheet 2
L.02	Treat wounds	Section C, Unit 1, Job Sheet 4
L.03	Identify and treat common diseases	Section C, Unit 2, Assignment Sheet 1, 2
L.04	Vaccinate animals	Section C, Unit 4, Job Sheets 5, 6, & 7
L.05	Use and store animal health products safely	Section C, Unit 4, Assignment Sheet 1
L.06	Develop a health plan	Section C, Unit 1, Assignment Sheet 1
L.07	Identify and treat animal pests and parasites	Section C, Unit 1, Job Sheet 3; Section C, Unit 2, Assignment Sheet 1
M	**MARK ANIMALS FOR IDENTIFICATION**	
M.01	Noseprint cattle	Section C, Unit 6, Job Sheet 5
M.02	Brand cattle	Section C, Unit 6, Job Sheet 3
M.03	Tattoo an animal	Section C, Unit 6, Job Sheet 4
M.04	Ear notch an animal	Section C, Unit 6, Job Sheet 6
M.05	Use alternate identification systems	Section C, Unit 6, Job Sheet 7
N	**PERFORM BASIC SURGICAL PROCEDURES**	
N.01	Castrate animals	Section C, Unit 5, Job Sheets 5, 6, & 7
N.02	Dehorn animals	Section C, Unit 5, Job Sheets 1 & 2
N.03	Dock sheep	Section C, Unit 5, Job Sheets 3 & 4
N.04	Trim hooves	Section C, Unit 6, Job Sheet 1

O	MARKET CROPS AND LIVESTOCK	
O.01	Interpret trends and cycles	Section D, Unit 1, Assignment Sheet 2
O.02	Develop a marketing plan	Farm Business Management
O.03	Calculate break even prices	Section D Unit 1, Assignment Sheets 3 & 4
O.04	Identify marketing opportunities	Section D, Unit 1, Assignment Sheet 1, 2
O.05	Interpret livestock and crop reports	Section D, Unit 1, Assignment Sheet 2
O.06	Select methods of marketing	Section D, Unit 1, Assignment Sheets 1 & 2

Required Activities and Resources (R)

These are fully integrated components of this CIMC curriculum. They are usually packaged in or with the curriculum and are essential in meeting the learning objectives. To individualize this unit, use the LAP Sheet supplied in your resources.

- Reproducible Handouts and Transparency Masters are included in the Instructor's Resource Package. Handouts should be copied for all students. Transparency Masters should be used to make overhead transparencies for use during instruction. A small copy of each Transparency Master appears in the student's Information Sheets.
- Non-reproducible resources are included in the student's curriculum.

Optional Activities and Resources (O)

These are suggested high-interest activities to help deliver learning objectives to students or to let students achieve objectives in an applied context. Select as many as you wish to use. Some activities use extra resources for further information about unit content. You can make them available in the classroom for in-depth study or optional activities, but their use is not required for meeting CIMC unit objectives.

FOCUS ASSIGNMENTS

Prereading

Have students read, *The Dark Side of the Sun: Sun Exposure and Agriculture*, by Julie Mitchell, OSU Extension Facts No. 1721.

Writing

Have students look up and write a definition for *melanoma*. Have them write a short essay (one paragraph to one page) about how to protect themselves from the harmful effects of the sun.

GENERAL INSTRUCTIONS

Assignment Sheets

R Review the directions and any specific guidelines.

- [R] Make certain that any needed materials from the Instructor's Resource Package are available.
- [R] Have the students complete the Assignment Sheet. Evaluate each student's performance and provide reteaching and retesting as necessary. Have the students repeat the Assignment Sheet until they achieve mastery.
- [R] Complete each student's Competency Profile.
- [O] Have the students volunteer to read aloud the directions and any special guidelines.
- [O] Return the completed Assignment Sheets to the students so that they may use them for later reference if needed.

Job Sheets

- [R] Review the introduction and evaluation criteria for the Job Sheet. Remind the students that they should not fill in the blanks in the Yes/No columns.
- [R] Review and explain all general guidelines, safety cautions, and warnings.
- [R] Make sure that all tools, equipment, and supplies are available.
- [R] Demonstrate each of the procedures outlined in the Job Sheet.
- [R] Allow the students to practice the Job Sheet skills before skills testing. Coach, correct, and supervise as necessary.
- [R] Have the students complete the Job Sheet. Evaluate each student's performance and provide remediation as necessary. Have the students repeat the Job Sheet until they achieve mastery.
- [R] Complete each student's Competency Profile.
- [R] Return the completed Job Sheets to the students so that they may use them for later reference if needed.
- [O] Have the students volunteer to read aloud the job guidelines, cautions, and warnings.

LAP Sheets

The LAP Sheets are an optional component that can be used to individualize instruction. The following instructions should be followed only if you are using the LAP Sheets.

R Explain the specific procedures to be followed to the students before they begin using the LAP Sheet. Be sure that each student understands the procedures for using the LAP Sheet.

R If you want the student to complete any of the assignments on the LAP Sheet that are labeled optional, assign these to the student. Be sure to provide any needed resources.

OBJECTIVE 1

Choose the word or phrase to complete statements about safety in the animal science industry.

O Show a video on safety.

O Invite a medical or paramedical professional to display and describe items found in a comprehensive first-aid kit. Check with your local Red Cross agency for resources.

O Display and demonstrate protective clothing, warning signs, and safety equipment.

O Have students write to OSHA to request safety information.

OBJECTIVE 2

Choose the word or phrase to complete statements about trends in animal science.

O Show a video on trends in animal science.

O Visit a poultry production facility to observe the level of automation.

OBJECTIVE 3

Report on current events in animal science. (Assignment Sheet 1)

R See the general instructions for all Assignment Sheets.

OBJECTIVE 4

State safety factors to observe in working livestock.

O Show a video on working livestock.

O Share and encourage students to share personal experiences involving safety and accidents when working with livestock.

O Visit a livestock facility and discuss safe operating procedures.

OBJECTIVE 5	**Select factors affecting facility safety.**
	O Visit facilities to review safety procedures and precautions.
OBJECTIVE 6	**State safety precautions for equipment.**
	O Show a video on safety precautions.
	O Invite an electrician to discuss electrical safety.
OBJECTIVE 7	**Observe livestock facilities for potential hazards. (Assignment Sheet 2)**
	R Arrange a field trip to an animal production operation.
	R See the general instructions for all Assignment Sheets.
OBJECTIVE 8	**Analyze case studies for behavioral factors that affect livestock handling.**
	O Show a video on animal behavior.
	O Visit a livestock auction facility to see how they move livestock from trucks to the auction block.
	O Invite stock managers who control cattle, sheep, and sows to discuss the similarities and differences in behavior.
OBJECTIVE 9	**List common livestock-handling injuries and their causes.**
	O Invite a doctor to discuss injuries and injury prevention.
OBJECTIVE 10	**Develop a list of safety procedures for handling livestock. (Assignment Sheet 3)**
	R See the general instructions for all Assignment Sheets.
OBJECTIVE 11	**Choose the word or phrase to complete statements about hazards of animal diseases.**
	O Invite a doctor, veterinarian, or other medical professional to discuss zoonoses and prevention.
OBJECTIVE 12	**Discuss the impact of hormone use on animal and public safety.**
	O Have students identify current issues regarding hormone use.

EVALUATION

Pretest

- Use the unit Written Test for *both* the pretest and posttest. Give the students the pretest before they begin the unit.
- You may wish to use the CIMC publication *Measuring Learning and Competency Gains: The Pretest/Posttest Approach* for instructions and suggestions on giving pretests and using the results. Information for ordering this material is included in the optional resources section.
- Use pretest results to guide individual students in progressing through the unit, doing enrichment work, or moving to the next unit.

Focus Assignment

- Use an informal evaluation of the focus assignments as a diagnostic tool for determining if any students need extra help in reading comprehension or writing skills. Refer these students to their English instructor, Learning Resource Center, or Educational Enhancement Center.

Assignment Sheet

- Evaluate students on Assignment Sheet activities. Students must repeat an Assignment Sheet until they have mastered the activity.
- Complete each student's Competency Profile.

Skill Test

- Explain to the students that they will be asked to demonstrate the procedures on the Job Sheets as a skills test.
- Describe the rating scale used on the skills test.
- Reteach and retest as necessary.
- Complete each student's Competency Profile.

Posttest

- After they have completed the unit, give students the Written Test again.

- Explain to the students that they will be asked to demonstrate on the Written Test actions listed in the specific objectives.
- You may wish to use the CIMC publication *Measuring Learning and Competency Gains: The Pretest/Posttest Approach* for instructions and suggestions on giving posttests and using the results. Information for ordering this material is included in the optional resources section.
- Reteach and retest as necessary to meet individual student needs and state standards for student learning and competency gains.
- Complete the appropriate sections of the Competency Profiles.
- Review individual and group performance to evaluate teaching effectiveness. Adjust scope, sequence, or instructional methods for additional lessons as required.

REQUIRED RESOURCES

The items marked with an asterisk are included in the Instructor's Resource Package.

Publications

- Mitchell, Julie. *The Dark Side of the Sun: Sun Exposure and Agriculture*, OSU Extension Facts No. 1721. Stillwater, OK: Oklahoma State University, n.d.

OPTIONAL RESOURCES

Publications

- Dorman-Hickson, Nancy. "Gear Up for Safety." *Progressive Farmer*, November 1993, Vol. 108, No. 11, pp.18-22.
- Publications available from the OSU Cooperative Extension Service ((F=Extension Facts, B=Bulletin, L=Leaflet):
  - F-800, *Costs of Emergency Medical Service*
  - F-801, *Rules and Regulations Governing Emergency Medical Service*
  - F-880, *Trends in Food Consumption and the Food Product Industry*
  - B-783, *Trends in Oklahoma Agriculture*
  - L-225, *Farm Safety and Health*

- *Measuring Learning and Competency Gains: The Pretest/Posttest Approach.* Stillwater, OK: CIMC, Oklahoma Department of Vocational and Technical Education, 1992. For ordering information call 800-522-5810.

Media

- Videotapes available from the OSU Cooperative Extension Service (VT=educational or promotional videotape, TC=tape of satellite video-conference broadcast aired on a specific date):
  - **Safety**
    - TC121, *Field of Danger: Children on the Farm*
    - TC123, *Patterns of Change: Postcards from the Frontlines*
    - VT198, *Tractor Safety Begins With You*
    - VT320, *Hazardous Materials Orientation*
    - VT334, *Agricultural Chemical Emergency Response*
    - VT341, *Kids Talk Farm Safety Stuff*
    - VT346, *Poison Safety*
    - VT351, *Commercial Grain Handling: Safeguards to Success*
    - VT410 *Agricultural Equipment Operators Safety Series*
    - VT254 *Farm Chemical Safety is in Your Hands*
    - VT405 *Farm Injuries*
    - VT343 *Farm Safety: A Family Affair*
    - VT337 *Farm and Ranch Equipment Safety*
    - VT333 *On Farm Ag Chemical Safety*
    - VT332 *Safe Chemical Handling*
    - VT345 *When Nature Strikes*

- **Animal Science**
  - VT2 *A Partnership for Profitability: OSU Animal Science and the Beef Industry*
  - VT63A *Beef Cattle Handling Facilities*

- Safety equipment and photos of equipment for field and shop safety. *NASCO Agricultural Sciences Catalog.* Nasco-Fort Atkinson, 901 Janesville Ave., P.O. Box 901, Fort Atkinson, WI 53538-0901; 800-558-9595, FAX 414-563-8296.

UNIT REFERENCES

Publications

- Barrick, R. Kirby and Hobart L. Harmon. *Animal Production and Management.* New York: Gregg Division, McGraw-Hill Book Company, 1988.

- Bearden, H. Joe, and John W. Fuquay. *Applied Animal Reproduction.* Englewood Cliffs, NJ: Prentice Hall, 1992.

- Cooper, Elmer L. *Agriscience Fundamentals & Applications.* Albany, NY: Delmar Publishers Inc., 1990.

- Cooper, Elmer L. *Agricultural Mechanics: Fundamentals & Applications,* (2nd ed.). Albany, NY: Delmar Publishers Inc., 1992

- Cullen, Patrick T. *Applied Farm Animal Health: A Practical Guide.* Great Britain: Pergamon Press, 1991.

- Ensminger, M.E. *Animal Science Digest,* (1st ed.). Danville, IL: Interstate Publishers, Inc., 1991.

- Ensminger, M.E. *The Stockman's Handbook,* (7th ed.). Danville, IL: Interstate Publishers, Inc., 1992.

- Gillespie, James R. *Modern Livestock & Poultry Production,* (4th ed.). Albany, NY: Delmar Publishers Inc., 1992.

- Herren, Ray V. and Roy L. Donahue. *The Agriculture Dictionary.* Albany, NY: Delmar Publishers, Inc., 1991.

- Horne, Ann Gibson. *On-Site Farm Safety Survey,* OSU Current Report No. 1719. Stillwater, OK: Oklahoma State University, n.d.

- Mitchell, Julie. *The Dark Side of the Sun: Sun Exposure and Agriculture*, OSU Extension Facts No. 1721. Stillwater, OK: Oklahoma State University, n.d.

- Noyes, Ronald T. and Patricia E. Norris and Jim T. Criswell. *Rinsing and Disposing of Pesticide Containers*, OSU Extension Facts No. 7462. Stillwater, OK: Oklahoma State University, n.d.

- Pierce, Greg. *Agricultural Livestock Skills*. Stillwater, OK: CIMC, Oklahoma Department of Vocational and Technical Education, 1979.

ASSIGNMENT SHEETS

OBJECTIVE 3

Assignment Sheet 1.

Part 1:

Answers will vary. Students should provide summaries that are clear and concise. Evaluate spelling, grammar, and punctuation.

Part 2:

Oral reports will vary. Criteria for marking should include:

- content
- voice projection
- presentation (use of visual aids)
- use of specified time period

OBJECTIVE 7

Assignment Sheet 2.

Part 1:

Student's list should include twenty potential hazards.

Part 2:

Student should present in a two-column table form the potential hazards and the suggestion for rectifying the hazard. The table should be neat.

OBJECTIVE 10

Assignment Sheet 3.

1. Answers will vary. Possible answers include:
   - wear proper protective clothing
   - use curved chutes and proper ramps
   - use man-gates to allow quick and easy exit
   - use catwalks along loading ramp
   - remain in animal's line of sight
   - avoid entering flight-zone
   - avoid loud noises
   - feed animals properly before transporting
   - avoid quick movements
2. Answers will vary. Possible answers include:
   - wear proper protective clothing
   - use proper restraints
   - use catwalks along restraints
   - remain in animal's line of sight
   - avoid loud noises
   - feed bull properly before dehorning
   - avoid quick movements

WRITTEN TEST

OBJECTIVE 1

1. D
2. B
3. C
4. D
5. A
6. D

OBJECTIVE 2

1. C
2. D
3. C
4. C
5. C
6. B
7. B

OBJECTIVE 3

Evaluated on Assignment Sheet 1.

OBJECTIVE 4

1. Answer must include any ten of the following, in any order:

   - Wear protective clothing: steel-toed shoes, gloves, coveralls.
   - Use man-gates in pens to allow quick and easy exits for workers.
   - Avoid handling animals in small, confined areas.
   - Avoid slippery floors.
   - Use catwalks along chutes.
   - Maintain adequate lighting.
   - Remove horns from dangerous animals.
   - Restrain animals properly for foot trimming, surgery, or other operations.

- Stay in the animal's line of sight; approach animals from the front.
- Avoid entering the "flight zone."
- Avoid making sudden, loud noises.
- Allow cattle to follow herd leaders.
- Do not trust males, regardless of how docile they seem.
- Respect maternal instincts.
- Use proper disinfectant procedures when entering or opening body cavity.

OBJECTIVE 5

1. B
2. D
3. A
4. B
5. D
6. A

OBJECTIVE 6

1. Answer must include any ten of the following, in any order:
   - Operate only after receiving proper training.
   - Wear proper protective clothing.
   - Use the appropriate equipment for the job.
   - Operate and maintain equipment according to instruction manual.
   - Use shields and guards.
   - Inspect your equipment regularly.
   - Replace defective and worn parts.
   - Shut off the power before adjusting.

- Keep children and other non-operators away from equipment.
- Equip tractors with roll-over protection equipment.
- Remove keys from motorized equipment.
- Use sturdy hitches.
- Open doors and windows of the storage area before starting equipment.
- Place appropriate warning signs on equipment.

2. Answer must include any five of the following, in any order:
   - Use adequate space.
   - Keep storage area clean.
   - Store equipment and supplies neatly.
   - Maintain a complete first-aid kit.
   - Have appropriate fire safety equipment available.
   - Place appropriate signs in the storage area.

OBJECTIVE 7

Evaluated on Assignment Sheet 2.

OBJECTIVE 8

1. Anne will have difficulty loading the cattle. She should have lowered the ramp; the ramp should be no more than 20 degrees.
2. Jimmy should remove the piglets to a different pen before examining them. He should not examine the piglets in the same pen as the sow because the sow's maternal instincts may make her dangerous.
3. Nutritional deficiencies cause stress. Cattle should be fed properly before transporting them.
4. Frank Jr.'s father is upset because sudden loud noises can startle animals.
5. The boar remembers how it was treated in the past.

6. Sheep like to follow. By trapping the two sheep against the fence Shauna has entered the sheep's flight-zone.

7. The sheep ran because she entered the flight-zone.

OBJECTIVE 9

Answer must include six of the following, in any order (Additional correct answers may be introduced by the instructor during class discussions.):

- mashed and broken fingers – caused by gates and unexpected animal movement
- bruises and lacerations – caused by kicks and being stepped on
- rope burns – caused by sudden rope movement through unprotected hand
- eye injuries – caused by dirt and dust
- puncture wounds – caused by splinters, horns, or tools and equipment
- broken arms and legs – caused by falls and unexpected animal movement
- crushed internal organs – caused by shifting animals forcing the human body against an immobile surface or structure

OBJECTIVE 10

Evaluated on Assignment Sheet 3.

OBJECTIVE 11

1. D
2. C
3. B
4. A
5. C
6. A
7. D
8. A

OBJECTIVE 12

1. Answer should include any one of the following:
   - hormones improve feed efficiency
   - hormones increase the rate of growth (daily rate of gain)
   - hormones (BST) increases milk production
2. BST is a growth hormone that increaes milk production in dairy cows.
3. United States Food and Drug Administration (FDA)
4. DES was banned because it caused a rare form of cancer in daughters of women treated with the drug and because lab studies suggest that massive amounts of DES cause cancer in mice.
5. This is a bad idea because only properly trained individuals should add hormone additives to feed.
6. Feed additives contribute significantly to modern agriculture. Beef production would be reduced by 13% if feed additives were banned.

CIMC
TEST CODE SHEET

VOCATIONAL PROGRAM (BOOK TITLE) ANIMAL SCIENCE

UNIT NUMBER AND TITLE A-1 – SAFETY

TOTAL NUMBER OF TEST QUESTIONS 58

TOTAL NUMBER OF BASIC SKILL QUESTIONS 43

OBJECTIVE NUMBER	TEST QUESTION NUMBER(S)	BASIC SKILL CODE(S)
1	1-4, 6	X
1	5	U
2	1, 2, 5	E
2	3-6, 7	X
3	Evaluated on Assignment Sheet 1	
4	1-10	W
5	1-6	X
6	1-2	W
7	Evaluated on Assignment Sheet 2	
8	1-7	W
9	1-6	W
10	Evaluated on Assignment Sheet 3	
11	1-8	S
12	1-6	W

Required Activities and Resources (R)

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FOCUS ASSIGNMENTS

Prereading

Have students read *Skills For Employment: Assessing Job Skills* by Sarah E. Drummond, OSU Extension Technical Bulletin No. T-6102.

Writing

Have students write a short essay (one paragraph to one page) on "Why it is important to find a job that is right for you."

GENERAL INSTRUCTIONS

Assignment Sheets

R Review the directions and any specific guidelines.

- [R] Make certain that any needed materials from the Instructor's Resource Package are available.
- [R] Have the students complete the Assignment Sheet. Evaluate each student's performance and provide reteaching and retesting as necessary. Have the students repeat the Assignment Sheet until they achieve mastery.
- [R] Complete each student's Competency Profile.
- [O] Have the students volunteer to read aloud the directions and any special guidelines.
- [O] Return the completed Assignment Sheets to the students so that they may use them for later reference if needed.

Job Sheets

- [R] Review the introduction and evaluation criteria for the Job Sheet. Remind the students that they should not fill in the blanks in the Yes/No columns.
- [R] Review and explain all general guidelines, safety cautions, and warnings.
- [R] Make sure that all tools, equipment, and supplies are available.
- [R] Demonstrate each of the procedures outlined in the Job Sheet.
- [R] Allow the students to practice the Job Sheet skills before skills testing. Coach, correct, and supervise as necessary.
- [R] Have the students complete the Job Sheet. Evaluate each student's performance and provide remediation as necessary. Have the students repeat the Job Sheet until they achieve mastery.
- [R] Complete each student's Competency Profile.
- [R] Return the completed Job Sheets to the students so that they may use them for later reference if needed.
- [O] Have the students volunteer to read aloud the job guidelines, cautions, and warnings.

LAP Sheets

The LAP Sheets are an optional component that can be used to individualize instruction. The following instructions should be followed only if you are using the LAP Sheets.

R Explain the specific procedures to be followed to the students before they begin using the LAP Sheet. Be sure that each student understands the procedures for using the LAP Sheet.

R If you want the student to complete any of the assignments on the LAP Sheet that are labeled optional, assign these to the student. Be sure to provide any needed resources.

OBJECTIVE 1

Discuss employment opportunities at various education levels.

O Invite a career counselor to discuss career selection.

O Have students complete an interest inventory.

O Show a video on careers (see Optional Resources).

OBJECTIVE 2

Compare degree requirements in animal science from two colleges or universities. (Assignment Sheet 1)

R See the general instructions for all Assignment Sheets.

R Provide students with two college catalogs that offer degrees in animal science.

OBJECTIVE 3

Compare salaries and benefits in various careers. (Assignment Sheet 2)

R See the general instructions for all Assignment Sheets.

OBJECTIVE 4

Match areas of study/specialization in animal science required for a specific project to their descriptions.

R Photocopy and distribute Handout 1.

O Invite individuals to discuss their animal science careers.

OBJECTIVE 5

State requirements for a career in animal science.

O Invite industry and government recruiters to discuss requirements for various careers in animal science.

OBJECTIVE 6 — **Interview someone in the animal science industry. (Assignment Sheet 3)**

- R See the general instructions for all Assignment Sheets.
- R Approve each student's interviewee choice.
- R Approve each student's list of ten (or more) interview questions.
- R Photocopy and distribute Handout 2.
- R Approve each student's thank-you letter.

OBJECTIVE 7 — **Select true statements about organizations that employ people trained in animal science.**

- R Photocopy and distribute Handout 3.
- O Have students write a letter to a public or private organization requesting information about job opportunities.

OBJECTIVE 8 — **Identify the occupations that are necessary to support animal agriculture in your community. (Assignment Sheet 4)**

- R See the general instructions for all Assignment Sheets.
- R Provide copies of the local yellow pages.

OBJECTIVE 9 — **Outline a presentation on animal science careers. (Assignment Sheet 5)**

- R See the general instructions for all Assignment Sheets.
- R Photocopy and distribute Handouts 4 and 5.

OBJECTIVE 10 — **Give a presentation on a career in animal science. (Assignment Sheet 6)**

- R See the general instructions for all Assignment Sheets.
- R Photocopy a Speech Evaluation Sheet on page 12 for each student.
- O Demonstrate presentation skills by having students critique a "mock" presentation.

EVALUATION

Pretest

- Use the unit Written Test for *both* the pretest and posttest. Give the students the pretest before they begin the unit.
- You may wish to use the CIMC publication *Measuring Learning and Competency Gains: The Pretest/Posttest Approach* for instructions and suggestions on giving pretests and using the results. Information for ordering this material is included in the optional resources section.
- Use pretest results to guide individual students in progressing through the unit, doing enrichment work, or moving to the next unit.

Focus Assignment

- Use an informal evaluation of the focus assignments as a diagnostic tool for determining if any students need extra help in reading comprehension or writing skills. Refer these students to their English instructor, Learning Resource Center, or Educational Enhancement Center.

Assignment Sheet

- Evaluate students on Assignment Sheet activities. Students must repeat an Assignment Sheet until they have mastered the activity.
- Complete each student's Competency Profile.

Skill Test

- Explain to the students that they will be asked to demonstrate the procedures on the Job Sheets as a skills test.
- Describe the rating scale used on the skills test.
- Reteach and retest as necessary.
- Complete each student's Competency Profile.

Posttest

- After they have completed the unit, give students the Written Test again.

- Explain to the students that they will be asked to demonstrate on the Written Test actions listed in the specific objectives.

- You may wish to use the CIMC publication *Measuring Learning and Competency Gains: The Pretest/Posttest Approach* for instructions and suggestions on giving posttests and using the results. Information for ordering this material is included in the optional resources section.

- Reteach and retest as necessary to meet individual student needs and state standards for student learning and competency gains.

- Complete the appropriate sections of the Competency Profiles.

- Review individual and group performance to evaluate teaching effectiveness. Adjust scope, sequence, or instructional methods for additional lessons as required.

REQUIRED RESOURCES

The items marked with an asterisk are included in the Instructor's Resource Package.

Publications

- Drummond, Sarah E. *Skills For Employment: Assessing Job Skills.* OSU Technical Bulletin No. 6102.

OPTIONAL RESOURCES

Publications

- Publications available from CIMC. For ordering information call 800-522-5810.
  - *Career Development Activity Books*
  - *Pathfinder: Exploring Career and Educational Paths*
  - *The Complete Guide for Occupational Exploration*
  - *Occupational Clues*
  - *The Occupational Outlook Handbook*
  - *The Enhanced Guide for Occupational Exploration*
  - *Dream Catchers*
  - *Employment Skills for the 21st Century*

- *Critical Steps of Job Interviewing*

- *Measuring Learning and Competency Gains: The Pretest/Posttest Approach.* Stillwater, OK: CIMC, Oklahoma Department of Vocational and Technical Education, 1992. For ordering information call 800-522-5810.

- Publications available from the OSU Cooperative Extension Service (T=Technical Bulletin):

  - T-6102, *Skills For Employment: Assessing Job Skills*

  - T-6103, *Skills For Employment: Writing a Resume*

  - T-6104, *Skills For Employment: The Job Search*

  - T-6105, *Skills For Employment: The Job Application*

  - T-6106, *Skills For Employment: The Job Interview*

  - T-6107, *Skills For Employment: Accepting and Starting the Job*

Videos

- Videos available from CIMC. For ordering information call 800-522-5810.

  - *Careers for the 21st Century, Vol. I*

    - Program 1: *Veterinarian*

    - Program 10: *Educator*

  - *Careers for the 21st Century, Vol. II*

    - Program 1: *Teacher*

    - Program 5: *Researcher*

    - Program 11: *Dietitian*

  - *Careers for the 21st Century, Vol. III*

    - Program 3: *Biotechnology*

    - Program 4: *Molecular Biology*

- Program 5: *Environmental Engineer*
- Program 11: *Chemist, Purchasing Agent*
- Program 12: *Agribusiness*

- Creative Educational Video, P.O. Box 65265, Lubbock, TX 79424-5265. For ordering information call 800-922-9965.
  - *Practice Interview I*
  - *Practice Interview II*
  - *Getting in the Door*
  - *Resumes*
  - *Careers: The Right Fit*
  - *Careers: Marketing Yourself*
  - *Profile of the Perfect Employee*
  - *STAR: Job Interview*
  - *Prepared Speech*

☞ **NOTE:** The following videos include employment opportunities, necessary skills/degrees required, average salaries, and interviews with people working in the field.

  - *Marketing Specialists*
  - *Agricultural Producers*
  - *Social Service Professionals*
  - *Agricultural Scientists*
  - *Financial Specialists and Managers*
  - *Agricultural Scientists*
  - *Education and Communication Specialists*
  - *Agricultural Scientists*

- Videos available from the OSU Cooperative Extension Service
  - VT280, *Ag's New Professionals*
  - VT291, *Futures in Agriculture*
  - VT292, *Unbridled Opportunities: Careers in the Horse Industry*

Other Media

- Agriculture Careers Kit. *NASCO Agricultural Sciences Catalog.* Nasco-Fort Atkinson, 901 Janesville Ave., P.O. Box 901, Fort Atkinson, WI 53538-0901; 800-558-9595, FAX 414-563-8296.

UNIT REFERENCES

Publications

- Barrick, R. Kirby and Hobart L. Harmon. *Animal Production and Management.* New York: Gregg Division, McGraw-Hill Book Company, 1988.
- Ensminger, M.E. *Animal Science Digest,* (1st ed.). Danville, IL: Interstate Publishers, Inc., 1991.
- Ensminger, M.E. *The Stockman's Handbook,* (7th ed.). Danville, IL: Interstate Publishers, Inc., 1992.
- Fowler, Elizabeth M. *The New York Times Career Planner: A Guide to Choosing the Perfect Job From the 101 Best Opportunities of Tomorrow.* New York: Times Books, 1987.
- Gillespie, James R. *Modern Livestock & Poultry Production,* (4th ed.). Albany, NY: Delmar Publishers Inc., 1992.
- Herren, Ray V. and Roy L. Donahue. *The Agriculture Dictionary.* Albany, NY: Delmar Publishers, Inc., 1991.
- Herren, Ray V. *The Science of Animal Agriculture.* Albany, NY: Delmar Publishers, Inc., 1994.
- Krannich, Ronald L., *Careering and Re-Careering for the 1990s,* (2nd ed.). Woodbridge, VA: Impact Publications, 1991.
- Pierce, Greg. *Agricultural Livestock Skills.* Stillwater, OK: CIMC, Oklahoma Department of Vocational and Technical Education, 1979.

ASSIGNMENT SHEETS

OBJECTIVE 2

Assignment Sheet 1

Answers will vary. Essay should be checked for spelling and proper grammar.

OBJECTIVE 3

Assignment Sheet 2

Answers will vary. Be sure the positions and salaries are appropriate for the different education and experience levels.

OBJECTIVE 6

Assignment Sheet 3

Answers will vary.

OBJECTIVE 8

Assignment Sheet 4

Answers will vary.

OBJECTIVE 9

Assignment Sheet 5

Answers will vary.

OBJECTIVE 10

Assignment Sheet 6

Presentation evaluated using the following Speech Evaluation Sheet.

Speech Evaluation Sheet

Name _____ Score _____

Topic _____

Write an "X" in the appropriate blank.

INTRODUCTION	**Excellent**	**Good**	**Fair**	**Poor**	**Not Included**
Got audience's attention	____	____	____	____	____
Related to audience	____	____	____	____	____
Clearly stated topic	____	____	____	____	____
Topic sufficiently narrow	____	____	____	____	____
CONTENT AND STRUCTURE					
Main points were clear	____	____	____	____	____
Developed ideas logically	____	____	____	____	____
Transitions	____	____	____	____	____
Summarized main points	____	____	____	____	____
Conclusion ended the speech clearly and effectively	____	____	____	____	____
DELIVERY					
Could be heard	____	____	____	____	____
Willingness to share with the audience (confidence)	____	____	____	____	____
Eye contact	____	____	____	____	____
Physical expressiveness (face, gestures, movement, ease)	____	____	____	____	____
OVERALL EFFECTIVENESS	____	____	____	____	____
Subtotals	____	____	____	____	____
Scoring:	x 4	x 3	x 2	x 1	x 0
TOTAL SCORES	____	____	____	____	____

COMMENTS:

WRITTEN TEST

OBJECTIVE 1

1. an entry level position
2. Answer should include three of the following, in any order:
   - FFA
   - 4-H
   - Farm Bureau
   - Farmers Union
   - Breed Associations
3. a. $20,000
   b. $25,000
   c. $35,000
4. Answer must include all four of the following, in any order:
   - allows you to be part of a dynamic, interesting, and challenging industry
   - allows you to be in an industry in which you can use a balance of mental and physical skills
   - allows you to have an occupation associated with the production of tangible and useful products that are essential to all humans
   - allows you a good chance of job security
5. agribusiness (industry)
6. Answer should include the following, in any order:
   - summer jobs
   - part-time jobs
   - internships during junior or senior years in college

7. Answer should include the following, in any order:

   - Complete an interest inventory.
   - Understand your skills and interests – look to your own preferences and talents.
   - Understand your limitations.
   - Consider opportunities for advancement.
   - Consider health hazards.

OBJECTIVE 2

Evaluated on Assignment Sheet 1.

OBJECTIVE 3

Evaluated on Assignment Sheet 2.

OBJECTIVE 4

1. A
2. E
3. B
4. D
5. H
6. C
7. J
8. K

OBJECTIVE 5

1. a. **scientific background** – Science provides the foundation for understanding agriculture.

   b. **practical skills** – Practical skills exhibit how well you apply your knowledge to action.

   c. **communication** – Speech and written communication are important in all career areas.

   d. **dedication** – Dedication enables you to demonstrate your desire to work in the career.

e. **dependability**

Answer must include any four of the following, in any order:

- being on the job (or in class) every day
- starting work on time
- being prepared
- giving a full day's work for a full day's pay
- observing safety practices

f. **professionalism**

Answer must include the following, in any order:

- acting in a business-like manner appropriate to the position
- dressing appropriately, always looking clean and neat
- using appropriate language
- developing a reputation for integrity

2. Answer must include all the following, in any order:

- assessing your job skills
- writing a resume
- searching for a position
- applying for a position
- interviewing
- following up with correspondence
- accepting and starting the job

OBJECTIVE 6

Evaluated on Assignment Sheet 3.

OBJECTIVE 7	1, 2, 5, 6
OBJECTIVE 8	**Evaluated on Assignment Sheet 4.**
OBJECTIVE 9	**Evaluated on Assignment Sheet 5.**
OBJECTIVE 10	**Evaluated on Assignment Sheet 6.**

CIMC
TEST CODE SHEET

VOCATIONAL PROGRAM (BOOK TITLE) ANIMAL SCIENCE

UNIT NUMBER AND TITLE A-2 – CAREERS

TOTAL NUMBER OF TEST QUESTIONS 24

TOTAL NUMBER OF BASIC SKILL QUESTIONS 24

OBJECTIVE NUMBER	TEST QUESTION NUMBER(S)	BASIC SKILL CODE(S)
1	1, 2, 3 a-c, 4, 5, 6, 7	E
2	Evaluated on Assignment Sheet 1	
3	Evaluated on Assignment Sheet 2	
4	1-8	E
5	1 a-f, 2	E
6	Evaluated on Assignment Sheet 3	
7	1-6	E
8	Evaluated on Assignment Sheet 4	
9	Evaluated on Assignment Sheet 5	
10	Evaluated on Assignment Sheet 6	

Required Activities and Resources (R)

These are fully integrated components of this CIMC curriculum. They are usually packaged in or with the curriculum and are essential in meeting the learning objectives. To individualize this unit, use the LAP Sheet supplied in your resources.

- Reproducible Handouts and Transparency Masters are included in the Instructor's Resource Package. Handouts should be copied for all students. Transparency Masters should be used to make overhead transparencies for use during instruction. A small copy of each Transparency Master appears in the student's Information Sheets.
- Non-reproducible resources are included in the student's curriculum.

Optional Activities and Resources (O)

These are suggested high-interest activities to help deliver learning objectives to students or to let students achieve objectives in an applied context. Select as many as you wish to use. Some activities use extra resources for further information about unit content. You can make them available in the classroom for in-depth study or optional activities, but their use is not required for meeting CIMC unit objectives.

FOCUS ASSIGNMENTS

Prereading

R Read *Federal Assistance Programs Retrieval System*, OSU Extension Facts No. 832.

Writing

R Have the students write a short essay (one paragraph to one page) on how to find information on Federal programs using the Federal Assistance Programs Retrieval System.

GENERAL INSTRUCTIONS

Assignment Sheets

- [R] Review the directions and any specific guidelines.
- [R] Make certain that any needed materials from the Instructor's Resource Package are available.
- [R] Have the students complete the Assignment Sheet. Evaluate each student's performance and provide reteaching and retesting as necessary. Have the students repeat the Assignment Sheet until they achieve mastery.
- [R] Complete each student's Competency Profile.
- [O] Have the students volunteer to read aloud the directions and any special guidelines.
- [O] Return the completed Assignment Sheets to the students so that they may use them for later reference if needed.

Job Sheets

- [R] Review the introduction and evaluation criteria for the Job Sheet. Remind the students that they should not fill in the blanks in the Yes/No columns.
- [R] Review and explain all general guidelines, safety cautions, and warnings.
- [R] Make sure that all tools, equipment, and supplies are available.
- [R] Demonstrate each of the procedures outlined in the Job Sheet.
- [R] Allow the students to practice the Job Sheet skills before skills testing. Coach, correct, and supervise as necessary.
- [R] Have the students complete the Job Sheet. Evaluate each student's performance and provide remediation as necessary. Have the students repeat the Job Sheet until they achieve mastery.
- [R] Complete each student's Competency Profile.
- [R] Return the completed Job Sheets to the students so that they may use them for later reference if needed.
- [O] Have the students volunteer to read aloud the job guidelines, cautions, and warnings.

LAP Sheets

The LAP Sheets are an optional component that can be used to individualize instruction. The following instructions should be followed only if you are using the LAP Sheets.

R Explain the specific procedures to be followed to the students before they begin using the LAP Sheet. Be sure that each student understands the procedures for using the LAP Sheet.

R If you want the student to complete any of the assignments on the LAP Sheet that are labeled optional, assign these to the student. Be sure to provide any needed resources.

OBJECTIVE 1

Choose the word or phrase to complete statements about the development, structure, and current status of the USDA.

R Discuss the development, structure, and current status of the USDA

O Have students develop individual reports on various programs, services and departments in the USDA.

O Visit a local office of any division of the USDA.

OBJECTIVE 2

Discuss services and responsibilities of the Oklahoma Department of Agriculture.

R Discuss the various services provided by, and responsibilities of, the Oklahoma Department of Agriculture.

R Show the ODA's 14-minute video "In Partnership with You."

O Visit a farmer's market.

O Invite employees from several ODA divisions to visit the class and discuss their duties.

O Have students bring samples of "Made in Oklahoma" products to class.

OBJECTIVE 3 — **Match specific governmental agencies with the services they provide.**

- R Discuss the services provided by various governmental agencies.
- O Distribute copies of OSU Fact Sheets to students.
- O Take students to a County Extension office for a field trip.
- O Have students obtain and complete applications for loans through the FmHA (the students can keep or destroy the application after the project is completed).

OBJECTIVE 4 — **Discuss major legislation affecting animal production.**

- R Discuss major legislation affecting animal production.
- O Take students on a field trip to a library that has copies of the U.S. Code on file.
- O Have students report on a specific piece of legislation that affects animal production.

OBJECTIVE 5 — **Choose the word or phrase to complete statements about private agencies and their services.**

- R Discuss the services provided by private agencies.
- O Have students write one of the agencies to request information about joining.
- O Have students give an oral report on the purpose, membership, and activities of a private agency.

OBJECTIVE 6 — **Write a letter requesting information from a government or private agency. (Assignment Sheet 1)**

- R See the general instructions for all Assignment Sheets.

OBJECTIVE 7 — **Discuss new programs for research, conservation, production, and marketing.**

- R Discuss new programs affecting the animal industry.
- O Take a field trip to view a pilot project for a new program.

O Invite your county extension agent to visit the class and discuss new programs concerning the animal industry now being developed.

O Have the students give an oral report on the actual and/or proposed effects of new programs.

OBJECTIVE 8

Give an oral report on the actual and/or proposed effects of new programs. (Assignment Sheet 2)

R See the general instructions for all Assignment Sheets.

OBJECTIVE 9

Discuss the Farm Bill.

R Discuss the Farm Bill.

O Have students brainstorm about new programs they'd like to see included in future farm bills.

O Divide students into teams. Have each team contact the office of a different Oklahoma Congressman and request information on the 1995 Farm Bill (time frames, what the Congressman would like it to include, expected budget, etc.) and inform each Congressman what the class thinks it should include (the results of the brainstorming session)

EVALUATION

Pretest

- Use the unit Written Test for *both* the pretest and posttest. Give the students the pretest before they begin the unit.
- You may wish to use the CIMC publication *Measuring Learning and Competency Gains: The Pretest/Posttest Approach* for instructions and suggestions on giving pretests and using the results. Information for ordering this material is included in the optional resources section.
- Use pretest results to guide individual students in progressing through the unit, doing enrichment work, or moving to the next unit.

Focus Assignment

- Use an informal evaluation of the focus assignments as a diagnostic tool for determining if any students need extra help in reading comprehension or writing skills. Refer these students to their English instructor, Learning Resource Center, or Educational Enhancement Center.

Assignment Sheet

- Evaluate students on Assignment Sheet activities. Students must repeat an Assignment Sheet until they have mastered the activity.
- Complete each student's Competency Profile.

Skill Test

- Explain to the students that they will be asked to demonstrate the procedures on the Job Sheets as a skills test.
- Describe the rating scale used on the skills test.
- Reteach and retest as necessary.
- Complete each student's Competency Profile.

Posttest

- After they have completed the unit, give students the Written Test again.
- Explain to the students that they will be asked to demonstrate on the Written Test actions listed in the specific objectives.
- You may wish to use the CIMC publication *Measuring Learning and Competency Gains: The Pretest/Posttest Approach* for instructions and suggestions on giving posttests and using the results. Information for ordering this material is included in the optional resources section.
- Reteach and retest as necessary to meet individual student needs and state standards for student learning and competency gains.
- Complete the appropriate sections of the Competency Profiles.

- Review individual and group performance to evaluate teaching effectiveness. Adjust scope, sequence, or instructional methods for additional lessons as required.

OPTIONAL RESOURCES

Publications

- *Measuring Learning and Competency Gains: The Pretest/Posttest Approach.* Stillwater, OK: CIMC, Oklahoma Department of Vocational and Technical Education, 1992. For ordering information call 800-522-5810.

UNIT REFERENCES

Publications

- *Bringing the University to You.* Stillwater, OK: Oklahome State University, Cooperative Extension Service.
- Conservation Choices: Your Guide to 30 Conservation and Environmental Farming Practices. Des Moines, Iowa: Soil Conservation Service, U.S. Department of Agriculture, 1993.
- *Federal Food, Drug, and Cosmetic Act, As Amended.* Rockville, MD: FDA, U.S. Department of Health and Human Services, 1993.
- Hafs, Harold D., Merck Sharp, and Dohme Research Laboratories. "Future Applications for Embryo Transfer." 1987 von Humboldt Proceedings, p. 11-17.
- *In Partnership with You: Oklahoma Department of Agriculture.* Norman, Oklahoma: State Board of Agriculture, 1992.
- *OSU 1993 Publications and Videotapes.* Stillwater, OK: Oklahoma State University: Cooperative Extension Service.
- Rasmussen, Wayne D. "Historical Overview of U.S. Agricultural Policies and Programs." Economic Research Service, United States Department of Agriculture.

- Sanders, Larry D. "An Overview of the 1985 Farm Bill." *Agricultural Policy and Economic Issues*, OSU: Cooperative Extension Service, Vol. 2, No. 1, January 1986.

- Sanders Larry D. "A Summary of the 1990 Farm Bill." *Agricultural Policy and Economic Issues*, OSU: Cooperative Extension Service, Vol. 5, No. 10, November 1990.

- Sanders Larry D. "Farm Policy Issues for 1993 & Beyond." *Agricultural Policy and Economic Issues*, OSU: Cooperative Extension Service, Vol. 8, No. 11, December 1992.

- Shipman, Lori and Ross O. Love. "Oklahoma Beginning Farmer Loan Program." *Agricultural Policy and Economic Issues*, OSU: Cooperative Extension Service, December 1993.

- *The United States Government Manual 1993/1994.* Washington, D.C.: Office of the Federal Registry, 1993.

- *USDA Today.* Office of Public Affairs, United States Department of Agriculture.

Videos

- *Oklahoma Department of Agriculture: In Partnership with You.* Public Information Office, 2800 N. Lincoln Blvd., Okla. City, OK 73105, 405-521-3864.

ASSIGNMENT SHEETS

OBJECTIVE 6

Assignment Sheet 1.

Letters will vary but all should be

- clear
- concise
- grammatically correct and
- include
  - date
  - return address
  - inside address
  - heading
  - what information is desired
  - where to send the requested information
  - how to get in touch with the student
  - closing
  - self-addressed, stamped envelope

OBJECTIVE 8

Assignment Sheet 2

Make sure the student's presentation is:

- about a new program in the animal industry
- well researched
- well organized
- well rehearsed
- complete
- whatever length of time you assigned

WRITTEN TEST

OBJECTIVE 1

1. C
2. A
3. B
4. B
5. C
6. A
7. D
8. A
9. C
10. C

OBJECTIVE 2

1. barriers in trade, language, cultural differences, and government regulations
2. Almost anything dealing with the natural environment in this state, from fertilizers to feed yards
3. enforces state laws that affect agricultural products
4. protecting consumers
   promoting Oklahoma agriculture
5. coyotes, beavers, some bird groups — wildlife damage is usually controlled by reducing the number of wild animals who are causing the problems
6. animals
   meat
   food products
7. to control disease and parasites
8. International Market Development
   Domestic Marketing Section
   Market News Section

OBJECTIVE 3

1. E
2. H
3. A
4. L
5. N
6. I
7. D
8. B
9. K
10. G
11. M

OBJECTIVE 4

1. It was created to enhance and protect the nation's air supply and it helps protect livestock from air pollution.
2. It was created to prevent, reduce, and eliminate pollution in U.S. lakes, rivers/estuaries and ground water.
3. Answer must include any three of the following:
   - the allowed activity of a stockyard dealer or market agency
   - requirements for stockyard dealers to be registered and bonded
   - the rights and responsibilities of dealers
   - systems for setting rates, practices, and fees
   - prevention of unfair, discriminatory, or deceptive practices in stockyards
   - penalties for violating any provisions of this act
4. Answer should include any three of the following:
   - examining animals prior to their being slaughtered
   - slaughtering diseased animals separately and examining their carcasses
   - proper labeling and marking of meat
   - the use of proper meat containers
   - regulating and inspecting slaughter and packing businesses for sanitary conditions

OBJECTIVE 5

1. B
2. A
3. D
4. A
5. C
6. B
7. B

OBJECTIVE 6

Evaluated on Assignment Sheet 1.

OBJECTIVE 7

1. to go more global (expand its international market)
2. Answers should include any three of the following:
   - purchasing farmland
   - improving land
   - buying or constructing farm buildings
   - acquiring depreciable farm machinery and equipment
   - buying livestock for breeding purposes
3. All of the following answers should be given:
   - protecting local water quality by preventing runoff of waste into the water supply
   - cutting fertilizer costs
   - reducing the loss of nutrients in the manure
   - being constructed in a way that allows the waste to be pumped out onto adjacent fields, when needed
4. Answers should include all of the following:
   - increasing growth and feed efficiency
   - improving body composition
   - making the animal disease resistant
   - producing natural products

OBJECTIVE 8

Evaluated on Assignment Sheet 2.

OBJECTIVE 9

1. An omnibus piece of legislation, passed by Congress every three to five years, and concerned with every aspect of agriculture, rural development, and solutions to rural and agricultural crises
2. farm cost and profitability factors protecting the environment, and conserving natural resources

3. A drop in the export demand for U.S. agricultural products in the 1920s led to lower farm prices, while nonagricultural prices and wages stayed the same. This led to a depression in the farm industry. Since more than one-fourth of the U.S. labor force was then employed in agriculture, many believe the farm depression led to the Great Depression.

4. Answer should include any three of the following:

   - government commodity programs
   - enhanced export support programs
   - market promotion programs
   - environmental and conservation programs
   - wetlands protection programs
   - water quality programs
   - support and funds for research and agricultural extension programs
   - rural development programs

5. Answers must include at least three of the following:

   - target prices for major commodities
   - government farm loan interest rates
   - credit requirements
   - farm deficiency payments
   - crop insurance provisions
   - government crop support programs
   - food stamp aid
   - rural development assistance programs
   - funding for research and extension programs

CIMC
TEST CODE SHEET

VOCATIONAL PROGRAM (BOOK TITLE) ANIMAL SCIENCE

UNIT NUMBER AND TITLE A-3 – PRIVATE AND GOVERNMENT AGENCIES, THEIR SERVICES, AND PROGRAMS

TOTAL NUMBER OF TEST QUESTIONS 42

TOTAL NUMBER OF BASIC SKILL QUESTIONS 35

OBJECTIVE NUMBER	TEST QUESTION NUMBER(S)	BASIC SKILL CODE(S)
1	1-10	U
2	1-6	W, U
3	1-11	U
4	1-4	W, U
5	1-7	X
6	Evaluated on Assignment Sheet 1	
7	1-4	W
8	Evaluated on Assignment Sheet 2	

Required Activities and Resources (R)

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- Non-reproducible resources are included in the student's curriculum.

Optional Activities and Resources (O)

These are suggested high-interest activities to help deliver learning objectives to students or to let students achieve objectives in an applied context. Select as many as you wish to use. Some activities use extra resources for further information about unit content. You can make them available in the classroom for in-depth study or optional activities, but their use is not required for meeting CIMC unit objectives.

FOCUS ASSIGNMENTS

Prereading

Have students read *Inbreeding in Swine*, by David S. Buchanan and Archie C. Clutter, OSU Extension Facts No. 3606 and *Swine Crossbreeding Systems*, by David S. Buchanan and William G. Luce, OSU Extension Facts No. 3603.

Writing

Have students write a short essay (one paragraph to one page) describing why crossbreeding is used by the majority of producers across the nation.

GENERAL INSTRUCTIONS

Assignment Sheets

- R Review the directions and any specific guidelines.
- R Make certain that any needed materials from the Instructor's Resource Package are available.
- R Have the students complete the Assignment Sheet. Evaluate each student's performance and provide reteaching and retesting as necessary. Have the students repeat the Assignment Sheet until they achieve mastery.
- R Complete each student's Competency Profile.
- O Have the students volunteer to read aloud the directions and any special guidelines.
- O Return the completed Assignment Sheets to the students so that they may use them for later reference if needed.

Job Sheets

- R Review the introduction and evaluation criteria for the Job Sheet. Remind the students that they should not fill in the blanks in the Yes/No columns.
- R Review and explain all general guidelines, safety cautions, and warnings.
- R Make sure that all tools, equipment, and supplies are available.
- R Demonstrate each of the procedures outlined in the Job Sheet.
- R Allow the students to practice the Job Sheet skills before skills testing. Coach, correct, and supervise as necessary.
- R Have the students complete the Job Sheet. Evaluate each student's performance and provide remediation as necessary. Have the students repeat the Job Sheet until they achieve mastery.
- R Complete each student's Competency Profile.
- R Return the completed Job Sheets to the students so that they may use them for later reference if needed.
- O Have the students volunteer to read aloud the job guidelines, cautions, and warnings.

LAP Sheets

The LAP Sheets are an optional component that can be used to individualize instruction. The following instructions should be followed only if you are using the LAP Sheets.

- [R] Explain the specific procedures to be followed to the students before they begin using the LAP Sheet. Be sure that each student understands the procedures for using the LAP Sheet.
- [R] If you want the student to complete any of the assignments on the LAP Sheet that are labeled optional, assign these to the student. Be sure to provide any needed resources.

OBJECTIVE 1

Choose the word or phrase to complete statements about selecting and breeding livestock.

- [O] Show the pertinent sections of *Beef Reproduction-I, -II, and -III,* and *Swine Reproduction-I* and *-II,* or other videotapes on swine, cattle, and sheep reproduction.
- [O] Invite a vet or a stock manager to discuss the importance of selecting and breeding livestock.
- [O] Visit a breeding facility.

OBJECTIVE 2

Choose the word or phrase to complete statements about selecting livestock for desirable characteristics.

- [O] Show an audiovisual presentation on selection, such as: *Purebred Operations; Breeding Cattle Selection; Market and Feeder Cattle Selection; Boar Selection; Female Selection in Swine; Breeding Herd Selection and Management; Selection of Breeding Stock; Breeding Management.*
- [O] Visit a meat packing facility and observe the processing of market animals.

OBJECTIVE 3

Discuss basic genetic principles.

- [R] Use transparencies 1, 2, and 3 to discuss basic genetic principals.
- [R] Teach objectives 3, 4, 5, and 6 together.
- [O] Let students view a cell, egg, and sperm under a microscope.
- [O] Show *DNA and Genes* or other video on genetic principles.

OBJECTIVE 4 — **Match types of livestock to their numbers of chromosome pairs.**

- O Compare the number of chromosome pairs in animals listed in this objective with rodents, insects, fish, and birds.

OBJECTIVE 5 — **Choose the word or phrase to complete statements about how genetic characteristics are transmitted.**

- O Have students research other dominant-recessive traits.
- O Show *Genetics of Coat Color of Horses* or other video on genetic characteristics.

OBJECTIVE 6 — **Discuss inherited traits and heritability.**

- R Use transparencies 4, 5, and 6 to discuss inherited traits and heritability.
- O Invite a stock manager to discuss how animals are bred for specific traits.

OBJECTIVE 7 — **Discuss sex determination and sex-linked traits.**

- R Use transparency 7 to discuss sex determination and sex-linked traits.
- O Have students investigate sex-linked traits of cattle, swine, sheep, and poultry.

OBJECTIVE 8 — **Draw a diagram showing the inheritance of horns in cattle for the F_1 and F_2 generations. (Assignment Sheet 1)**

- R See the general instructions for all Assignment Sheets.

OBJECTIVE 9 — **Determine color inheritance of offspring. (Assignment Sheet 2)**

- R See the general instructions for all Assignment Sheets.

OBJECTIVE 10 — **Estimate possible gene combinations using the Punnett Square method. (Assignment Sheet 3)**

- R See the general instructions for all Assignment Sheets.

OBJECTIVE 11 — **Match abnormal genetic conditions to their descriptions.**

- R Use transparency 8 to discuss abnormal genetic conditions.
- O Show *Cattle Abnormalities* or similar media presentation.

OBJECTIVE 12 **List factors affecting fertility.**

- [O] Have students list specific conditions that would create each of these causes.

OBJECTIVE 13 **Choose the word or phrase to complete statements about Expected Progeny Difference records (EPDs).**

- [R] Interpret a sample EPD with students.
- [O] Invite a breed association member to discuss EPDs and how they relate to the breed.
- [O] Have students write to a breed association asking for EPD information and charts.

  ☞ **NOTE:** Breed associations, their addresses, and phone numbers can be found in *The Stockman's Handbook*.

OBJECTIVE 14 **Analyze Expected Progeny Difference (EPD) records and performance records. (Assignment Sheet 4)**

- [R] See the general instructions for all Assignment Sheets.

OBJECTIVE 15 **Select from a list true statements about production testing.**

- [O] Invite a stock manager to discuss the importance of production testing.
- [O] Visit a facility that uses production testing.

OBJECTIVE 16 **Calculate percentage calf/lamb crop. (Assignment Sheet 5)**

- [R] See the general instructions for all Assignment Sheets.

OBJECTIVE 17 **Discuss a specific advance in genetic engineering.**

- [O] You may substitute or add another genetic engineering event.

  ☞ **NOTE:** Test over additional material.
- [O] Invite a geneticist to discuss genetic advances.
- [O] Have students read an article on a recent topic in genetic engineering and present a short oral report.
- [O] Show *Biotechnology: Science for the Future, The Nature of Change* or other video on genetic engineering.

OBJECTIVE 18 **Match mating systems to their descriptions, advantages, and disadvantages.**

- O Invite stock managers who use different mating systems to compare and contrast the advantages and disadvantages of the different systems.
- O Photocopy and distribute Handout 1.

OBJECTIVE 19 **Select mating methods. (Assignment Sheet 6)**

- R See the general instructions for all Assignment Sheets.
- R Collect and display mating method diagrams.

OBJECTIVE 20 **Define breeding periods.**

- O Have students write an essay using these terms and their definitions to describe the reproductive process.

OBJECTIVE 21 **Choose the word or phrase to complete statements about estrus.**

- O Visit a breeding facility and observe animals in heat and the use of various marking devices.

OBJECTIVE 22 **Match farm animals to their normal estrous cycles.**

- R Use transparencies 9, 10, and 11 to discuss estrus and the signs of estrus.
- O Invite a stock manager to discuss the optimal time to breed stock.

OBJECTIVE 23 **Identify points in time on an estrous cycle chart. (Assignment Sheet 7)**

- R See the general instructions for all Assignment Sheets.

OBJECTIVE 24 **Determine the proper times for breeding. (Assignment Sheet 8)**

- R See the general instructions for all Assignment Sheets.

OBJECTIVE 25 **Choose the word or phrase to complete statements about heat synchronization.**

- O Visit a breeding facility that practices heat synchronization.

OBJECTIVE 26

Match livestock to their gestation periods.

- ☐ Use flash cards to help students learn gestation periods for each species.

OBJECTIVE 27

Discuss methods of selecting poultry.

- ☐ Visit a poultry production facility.

EVALUATION

Pretest

- Use the unit Written Test for *both* the pretest and posttest. Give the students the pretest before they begin the unit.
- You may wish to use the CIMC publication *Measuring Learning and Competency Gains: The Pretest/Posttest Approach* for instructions and suggestions on giving pretests and using the results. Information for ordering this material is included in the optional resources section.
- Use pretest results to guide individual students in progressing through the unit, doing enrichment work, or moving to the next unit.

Focus Assignment

- Use an informal evaluation of the focus assignments as a diagnostic tool for determining if any students need extra help in reading comprehension or writing skills. Refer these students to their English instructor, Learning Resource Center, or Educational Enhancement Center.

Assignment Sheet

- Evaluate students on Assignment Sheet activities. Students must repeat an Assignment Sheet until they have mastered the activity.
- Complete each student's Competency Profile.

Skill Test

- Explain to the students that they will be asked to demonstrate the procedures on the Job Sheets as a skills test.

- Describe the rating scale used on the skills test.
- Reteach and retest as necessary.
- Complete each student's Competency Profile.

Posttest

- After they have completed the unit, give students the Written Test again.
- Explain to the students that they will be asked to demonstrate on the Written Test actions listed in the specific objectives.
- You may wish to use the CIMC publication *Measuring Learning and Competency Gains: The Pretest/Posttest Approach* for instructions and suggestions on giving posttests and using the results. Information for ordering this material is included in the optional resources section.
- Reteach and retest as necessary to meet individual student needs and state standards for student learning and competency gains.
- Complete the appropriate sections of the Competency Profiles.
- Review individual and group performance to evaluate teaching effectiveness. Adjust scope, sequence, or instructional methods for additional lessons as required.

REQUIRED RESOURCES

The items marked with an asterisk are included in the Instructor's Resource Package.

Publications

- Buchanan, David S., and Archie C. Clutter. *Inbreeding in Swine*, OSU Extension Facts No. 3606. Stillwater, OK: Oklahoma State University, n.d.
- Buchanan, David S., and William G. Luce. *Swine Crossbreeding Systems*, OSU Extension Facts No. 3603. Stillwater, OK: Oklahoma State University, n.d.

OPTIONAL RESOURCES

Publications

- *Measuring Learning and Competency Gains: The Pretest/Posttest Approach.* Stillwater, OK: CIMC, Oklahoma Department of Vocational and Technical Education, 1992. For ordering information call 800-522-5810.

- *NASCO Agricultural Sciences Catalog.* Nasco-Fort Atkinson, 901 Janesville Ave., P.O. Box 901, Fort Atkinson, WI 53538-0901; 800-558-9595, FAX 414-563-8296.

  - *Livestock Judging, Selection, and Evaluation*
  - *Beef Cattle Science*
  - *The Sheep Raiser's Manual*
  - *Raising Poultry Successfully*
  - *Raising Poultry the Modern Way*
  - *Raising Sheep the Modern Way*

- OSU Extension Publications. Stillwater, Oklahoma: Oklahoma State University (F=Fact Sheet, E=Circular, T=Technical Report, CR=Current Report)

  - F-3150 *Crossbreeding Beef Cattle, I*
  - F-3153 *Crossbreeding Beef Cattle, IV*
  - F-3159 *Expected Progeny Difference: Part 1, Background on Breeding Value Estimation*
  - F-3160 *Expected Progeny Difference: Part 2, Growth Trait EPD's*
  - F-3161 *Expected Progeny Difference: Part 3, Maternal Trait EPD's*
  - F-3162 *Expected Progeny Difference: Part 4, Use of EPD's*
  - E-869 *The Management of Beef Cattle for Crossbreeding Programs*
  - F-3604 *Evaluating Breeds of Swine for Crossbreeding Programs*
  - T-155 *A Summary of Genetic and Phenotypic Statistics for Pubertal and Growth Characteristics in Swine*

- F-3801 *A Breeding Program for Fall Lambing*
- CR-3802 *Flock Improvement Through Ram Selection*

Videos

- *Cattle Abnormalities*. Bureau of Audio-Visual Instruction, University of Wisconsin Extension Service, Box 2093, Madison, WI 53701. Order No. 8861. (16-mm color film; 26 min)
- Creative Education Video. P.O. Box 65262, Lubbock, TX, 79424-5265, 800-922-9965. (VHS)
  - *Beef Reproduction I*
  - *Beef Reproduction II*
  - *Beef Reproduction III*
  - *Swine Reproduction I*
  - *Swine Reproduction II*
- *Genetics of Coat Color of Horses*. Educational Aids, National 4-H Council, 7100 Connecticut Ave., Chevy Chase, MD 20815. Order No. SL 501. (slide set)
- *The Nature of Change*. Modern Talking Picture Service Film Scheduling Center, 500 Park St., N., St. Petersburg, FL 33709. A companion booklet, "Genetic Engineering: A Natural Science," can be obtained from Direct Mail Corp., 1533 Washington Ave., St. Louis, MO 63103. Order No. VHS 17376 or 16-mm film 17373. (VHS or 16-mm film)
- Prentice-Hall Media, 150 White Plains Road., Tarrytown, NY 10591 (sound filmstrips)
  - *Boar Selection*
  - *Female Selection in Swine*
  - *Swine Breeding Systems*

- Vocational Education Productions, California Polytechnic State University, San Luis Obispo, CA, 93407:
  - *Breeding Herd Selection and Management* (sound filmstrip)
  - *DNA and Genes* (VHS)
  - *Biotechnology: Science for the Future* (VHS)
  - *Purebred Operations* (sound filmstrip)
  - *Breeding Cattle Selection* (sound filmstrip)
  - *Market and Feeder Selection* (sound filmstrip)
- Agricultural Products and Services, 2001 Killbrew Drive, Suite 333, Bloomington, MN 55420 (VHS):
  - *Types of Breeding Programs*
  - *Selection of Breeding Stock*
  - *Low Cost Swine Breeding Units*
  - *How to Handle Newly Purchased Breeding Stock*
  - *Breeding Management*

UNIT REFERENCES

Publications

- Barrick, R. Kirby and Hobart L. Harmon. *Animal Production and Management.* New York: Gregg Division, McGraw-Hill Book Company, 1988.
- Bearden, H. Joe, and John W. Fuquay. *Applied Animal Reproduction.* Englewood Cliffs, NJ: Prentice Hall, 1992.
- Cooper, Elmer L. *Agriscience Fundamentals & Applications.* Albany, NY: Delmar Publishers Inc., 1990.
- Cullen, Patrick T. *Applied Farm Animal Health: A Practical Guide.* Great Britain: Pergamon Press, 1991.
- Ensminger, M.E. *Animal Science Digest,* (1st ed.). Danville, IL: Interstate Publishers, Inc., 1991.
- Ensminger, M.E. *The Stockman's Handbook,* (7th ed.). Danville, IL: Interstate Publishers, Inc., 1992.

- Gillespie, James R. *Modern Livestock & Poultry Production*, (4th ed.). Albany, NY: Delmar Publishers Inc., 1992.
- Herren, Ray V. and Roy L. Donahue. *The Agriculture Dictionary*. Albany, New York: Delmar Publishers, Inc., 1991.
- Moody, E. Grant. *Raising Small Animals*. Ezra Taft Benson Agriculture and Food Institute, Ipswich, United Kingdom: Farming Press Books, 1991.
- Pierce, Greg. *Agricultural Livestock Skills*. Stillwater, OK: Curriculum and Instructional Materials Center, Oklahoma Department of Vocational and Technical Education, 1979.
- Stamm, G. W. *Veterinary Guide for Farmers*. New York: The Hearst Corporation, 1975.
- Thedford, Thomas R. *Sheep Health Handbook: A Field Guide for Producers with Limited Veterinary Services*. Winrock International Informational Services Publication in collaboration with Agricultural Experiment Station, Division of Agriculture, University of Arkansas, 1990.

Videos

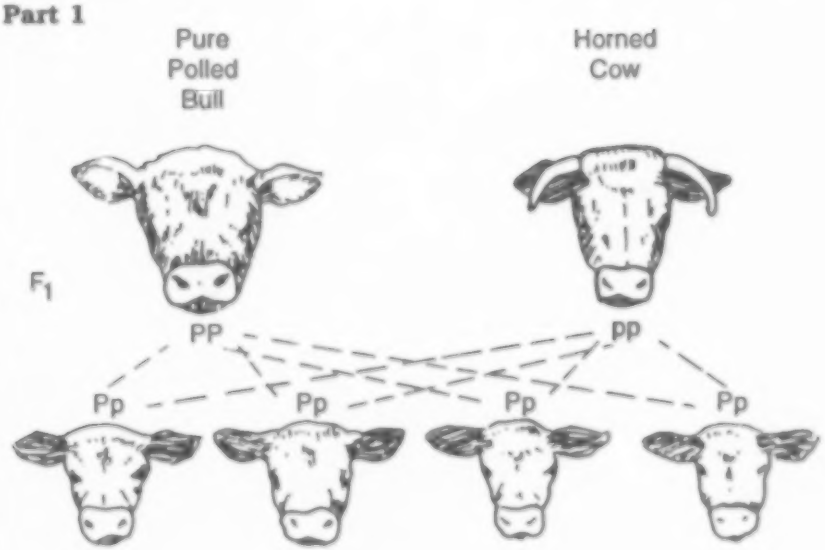
- Creative Education Video, P.O. Box 65262, Lubbock, TX, 79424-5265, 800-922-9965. Available to Oklahoma residents from the CIMC Resource Center. (VHS) (title followed by CIMC catalog number)
  - *Beef Reproduction I*, 205
  - *Beef Reproduction II*, 206
  - *Beef Reproduction III*, 207
  - *Swine Reproduction I*, 201
  - *Swine Reproduction II*, 202

ASSIGNMENT SHEETS

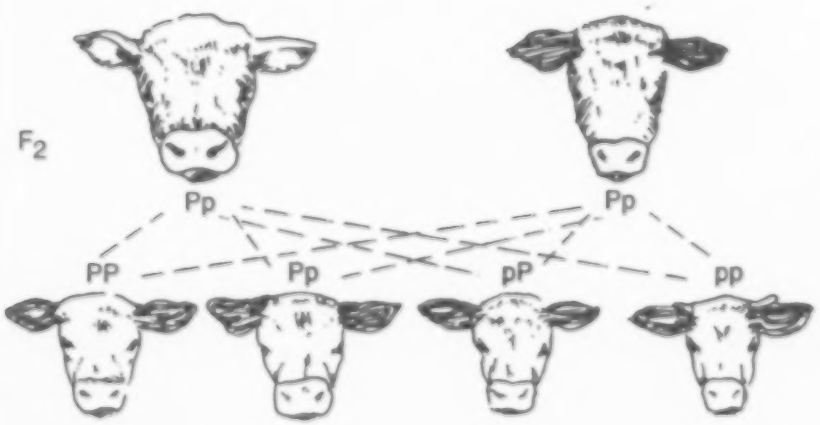
OBJECTIVE 8

Assignment Sheet 1

Part 1



Part 2



OBJECTIVE 9

Assignment Sheet 2

1. a. black coloring

   b. Bb

2. a. Bb or bb

   b. coloring would be either red (bb) or black (Bb), depending on the genotype of the offspring

3. a. Bb

   b. black coloring

4. a. black and white

   b. coloring would be either black and white or red and white, depending on the genotype of the offspring

   c. red and white

5. a. coloring would be either white or non-white, depending on the genotype of the offspring

   b. white coloring

   c. non-white coloring

6. a. black coloring

   b. white coloring

   c. coloring would be either black or white, depending on the genotype of the offspring

   d. white coloring

7. a. The offspring would have white coloring – genotype Ww. If two of the offspring were mated, the possibility exists for one of their offspring to have a genotype of ww – black coloring.

   b. two generations

OBJECTIVE 10

Assignment Sheet 3

1. a. Pp

   b. 4:0

   c. 4:0, all polled

2. a. Pp or pp

   b. 2:2

   c. 2:2

3. all offspring would have the genotype Dd

4. a. possible gene combinations: DD, Dd, or dd

   b. one would be pure for tall, DD

   c. two would have the genotype, Dd

   d. one would have the genotype, dd

5. a. The male and the female both have the genotype Rr. The two recessive genes combine to produce an offspring (rr) with a single comb.

   b. male: Rr

      female: Rr

6. a. four phenotype possibilities

   b. polled, black: 9

      polled, red: 3

      horned, black: 3

      horned, red: 1

7. a. male: PR

      female: pr

   b. genotype of offspring PpRr

8. a. PPRR: 1

PPRr: 2

PPrr: 1

PpRR: 2

PpRr: 4

ppRR: 1

ppRr: 2

Pprr: 2

pprr: 1

TOTAL: 16

b. polled red: 9

polled white: 3

horned red: 3

horned white: 1

9. a. Both the male and the female have a recessive color and a recessive horned gene. The checkerboard table shows one offspring out of sixteen having the gene combination bbpp.

b. male: BbPp

female: BbPp

OBJECTIVE 14

Assignment Sheet 4

1. a. Tom Chaffee Farms, Topeka, KS

b. Royal Salers, Weiser, ID

c. -1.7

2. a. horned

b. -1.0

c. +1.6 is the same as the average

3. Yearling weight EPD is the expected difference in weight of the offspring after one year compared to the average.

4. a. MR ERC 224S: -4.3

   MR NOY 11S: 1.0

   b. 5.3 pounds

   c. MR NOY 11S

   d. No. The EPD only provides progeny estimates. Actual results will be different.

5. a. Expected difference in birth weight: 0 pounds.

   The EPD for birth weight is the same for MR CHAIRMAN A30L and MR RAWHIDE DEAN.

   b. Expected difference in weaning weight: 9.2 pounds.

   MR CHAIRMAN A30L is expected to produce the heavier weaning weight offspring.

   c. below average

6. a. MR NOY 9S POLLED PACHA: -6.2

   MR DJL T121S: +8.4

   b. 14.6 pounds

   c. MR DJL T121S because MR DJL T121S' maternal milk is higher than MR NOY 9S POLLED PACHA's maternal milk.

7. A large birth weight EPD will result in larger calves being born. An older female would have increased birthing difficulty with a large calf; a large calf could damage the cow.

OBJECTIVE 16

Assignment Sheet 5

1. 90%

2. 75%

3. 83.3%

4. a. John: 80.8%

   b. Mary: 83.3%

c. Mary

5. a. 76%

b. 65.7%

c. 1993

OBJECTIVE 19

Assignment Sheet 6

Part 1: Answers will vary depending on the mating method selected by individual students.

If a student selected a straight breeding method, the answer should include:

- Advantages of straight breeding
  - concentrates on selected traits
  - develops uniformity
- Disadvantages of straight breeding
  - may result in less desirable traits
  - loss of hybrid vigor
  - improvement is a slow process

If a student selected a cross breeding method, the answer should include:

- Advantages of cross breeding
  - increased hybrid vigor
  - increased growth
  - higher fertility
  - increased disease resistance
- Disadvantages of cross breeding
  - reduced uniformity of offspring
  - offspring not eligible for registry

Part 2:

Answers will vary depending on the mating method selected by individual students.

OBJECTIVE 23

Assignment Sheet 7

1. between 12 and 20 hours after the start of estrus
2. 28 hours after the start of estrus
3. before
4. a. after the egg has been released
   b. a viable egg and viable sperm have to be in the proper place at the proper time
5. the first 18 hours of estrus
6. a. between 5:00 p.m. (May 4th) and 1:00 a.m. (May 5th)
   b. 9:00 a.m. on May 5th
7. 1 hour
8. Jack bred Emily too early.

OBJECTIVE 24

Assignment Sheet 8

Part 1:

1. 18 hours
2. 23-36 hours
3. answers will vary, literature is not definitive

Part 2:

Answers may vary, but should be neat, easy to read, and have an appropriate title and column headings as shown below.

Animal	Start of Estrus	End of Estrus	Best time to breed
Cathy the Cow	8:00 a.m. on June 3rd	between 12:00 a.m. and 2:00 a.m on June 4th	2:00 a.m. on June 4th
Sally the Sow	4:00 p.m. on July 4th	between 8:00 a.m. on July 6th and 4:00 a.m. on July 7th	between 3:00 p.m. on July 5th and 4:00 a.m. on July 6th
Emily the Ewe	6:00 a.m. on September 10th	12:00 p.m. on September 11th	* close to, but not after, 12:00 p.m. on September 11th

* Answer may vary. Any answer between 6:00 a.m. and 12:00 p.m. on September 11th is correct.

WRITTEN TEST

OBJECTIVE 1

1.	B	6.	C	11.	C
2.	C	7.	C	12.	B
3.	D	8.	B		
4.	D	9.	D		
5.	A	10.	A		

OBJECTIVE 2

1. D
2. C
3. C
4. A

OBJECTIVE 3

1. The nucleus enables the cell to grow, digest food, and divide.
2. a. on chromosomes
   b. genes carry genetic trait information
3. mitosis results in growth
   meiosis results in the formation of gametes (sperm, eggs)
4. Answer must include all of the following steps:
   - multiplication
   - chromosome pairing
   - chromosome reduction
   - division
5. when the male gamete (sperm) joins with the female gamete (egg)

6. a. no

   b. Answers may vary, all answers must include environmental considerations.

7. crossover – occurs when chromosome pair crosses over and splits

   mutation – causes genes to change

OBJECTIVE 4

1. B
2. H
3. G
4. D
5. E

OBJECTIVE 5

1. D
2. A
3. B
4. B
5. B
6. D

OBJECTIVE 6

1. genotype – refers to the genetic makeup: the pairs of genes that an animal possesses

   phenotype – refers to the physical appearance of an animal

2. Answer must include any five of the following, in any order:

   - carcass length
   - percent ham
   - loin eye area
   - percent lean cuts
   - five-month weight
   - number weaned
   - number farrowed
   - birth weight

3. Answer must include any four of the following, in any order:

   - face covering
   - staple length
   - yearling weight
   - weaning weight
   - multiple births

4. Answer must include any five of the following, in any order:

   - loin eye area
   - tenderness
   - carcass grade
   - birth weight
   - weaning weight
   - calving interval
   - cancer eye susceptibility

5. Answer must include any five of the following, in any order:

   - size
   - birth weight
   - weight
   - fore udder and rear udder
   - dairy character
   - mastitis
   - milking quality
   - udder depth
   - udder size and shape

OBJECTIVE 7

1. female has two identical sex chromosomes – XX

   male has two different sex chromosomes – XY

2. male has two identical sex chromosomes – ZZ

   female has two different sex chromosomes – ZW

3. sex-linked traits – hereditary characteristics propagated by genes located on the sex chromosomes

   Examples: barred color of chickens, thick neck of bull, hemophilia, or other sex-linked trait discussed in class

OBJECTIVE 8

Evaluated on Assignment Sheet 1.

OBJECTIVE 9

Evaluated on Assignment Sheet 2.

OBJECTIVE 10

Evaluated on Assignment Sheet 3.

OBJECTIVE 11

1.	F	6.	K	11.	G
2.	L	7.	C		
3.	D	8.	A		
4.	O	9.	E		
5.	I	10.	M		

OBJECTIVE 12

1. Answer must include nine of the following, in any order:
   - low quality semen
   - physical defects and injuries
   - psychological condition
   - infection and disease
   - poor management and feeding
   - inherited abnormalities
   - age
   - high temperature
   - cystic ovary disease caused by hormonal imbalance
   - silent heat: A female that shows no sign of estrus
   - Freemartin: A female calf may be sterile if born with a male twin. The sex organs of the female fetus may not develop due to male hormonal influences during pregnancy.

OBJECTIVE 13

1.	C	6.	B
2.	D		
3.	D		
4.	D		
5.	A		

OBJECTIVE 14 **Evaluated on Assignment Sheet 4.**

OBJECTIVE 15 1, 4, 5, 6, 9, 10, 12, 14, 16

OBJECTIVE 16 **Evaluated on Assignment Sheet 5.**

OBJECTIVE 17

1. the pituitary gland
2. It causes feed to be converted to milk production rather than to weight gain.
3. BST gene, from cows, is spliced into the bacteria's DNA. Bacteria with BST gene is able to produce BST.
4. none
5. increased level of BST results in increased milk production

OBJECTIVE 18

Part 1:

1.	K	6.	D
2.	G	7.	I
3.	E	8.	L
4.	A		
5.	C		

Part 2:

Advantages		Disadvantages	
1.	B	1.	A
2.	B	2.	B
3.	A	3.	B
4.	B	4.	A
5.	A		
6.	B		

OBJECTIVE 19 **Evaluated on Assignment Sheet 6.**

OBJECTIVE 20

1. puberty – the age at which an animal produces viable eggs or sperm
2. estrous cycle – the time when an egg is produced and capable of being fertilized
3. ovulation – the release of the egg from the ovary
4. fertilization – the union of a sperm cell with an egg cell, resulting in a zygote
5. gestation – the time when an animal is pregnant
6. parturition – the act of giving birth

OBJECTIVE 21

1. B
2. A
3. B
4. B
5. C

OBJECTIVE 22

1. B
2. A
3. D

OBJECTIVE 23 **Evaluated on Assignment Sheet 7.**

OBJECTIVE 24 **Evaluated on Assignment Sheet 8.**

OBJECTIVE 25

1. B
2. B
3. C

OBJECTIVE 26

1. E
2. D
3. B

OBJECTIVE 27

1. physical appearance, pedigree, and family
2. Answer must include any four of the following, in any order:
   - clean, smooth face
   - good-sized comb with good color
   - deep, broad, angular body form
   - broad, flat back
   - fully feathered with good quality plumage
   - shanks with good healthy color
   - well-balanced on feet and toes
3. cull poultry not meeting standards
4. Answer must include any four of the following, in any order:
   - wide breast; broad, straight back; bulging thighs; and heavily meated legs
   - high percentage of meat on bone
   - light, cream colored fat evenly distributed over the body
   - absence of common defects, bruise, and broken bones

CIMC
TEST CODE SHEET

VOCATIONAL PROGRAM (BOOK TITLE) ANIMAL SCIENCE

UNIT NUMBER AND TITLE B-1 – SELECTING AND BREEDING LIVESTOCK

TOTAL NUMBER OF TEST QUESTIONS 114

TOTAL NUMBER OF BASIC SKILL QUESTIONS 75

OBJECTIVE NUMBER	TEST QUESTION NUMBER(S)	BASIC SKILL CODE(S)
1	1-5, 7, 9-12	X
1	6, 8	S
2	1-4	X
3	1-7	W, S
4	1-5	S
5	1-6	S
6	1-5	W, S
7	1-3	S
8	Evaluated on Assignment Sheet 1	
9	Evaluated on Assignment Sheet 2	
10	Evaluated on Assignment Sheet 3	
11	1-11	S
12	1-9	S
13	1, 3-6	X
13	2	M
14	Evaluated on Assignment Sheet 4	

CIMC
TEST CODE SHEET

VOCATIONAL PROGRAM (BOOK TITLE) ANIMAL SCIENCE

UNIT NUMBER AND TITLE B-1 SELECTING AND BREEDING LIVESTOCK

OBJECTIVE NUMBER	TEST QUESTION NUMBER(S)	BASIC SKILL CODE(S)
15	1-9	X
16	Evaluated on Assignment Sheet 5	
17	1-5	W, S
18	1-8	X
19	Evaluated on Assignment Sheet 6	
20	1-6	W, S
21	1-5	S
22	1-4	S
23	Evaluated on Assignment Sheet 7	
24	Evaluated on Assignment Sheet 8	
25	1-3	X
26	1-3	S
27	1-4	W

INSTRUCTOR'S GUIDE

REPRODUCTIVE ORGANS B-2

Required Activities and Resources (R)

These are fully integrated components of this CIMC curriculum. They are usually packaged in or with the curriculum and are essential in meeting the learning objectives. To individualize this unit, use the LAP Sheet supplied in your resources.

- Reproducible Handouts and Transparency Masters are included in the Instructor's Resource Package. Handouts should be copied for all students. Transparency Masters should be used to make overhead transparencies for use during instruction. A small copy of each Transparency Master appears in the student's Information Sheets.
- Non-reproducible resources are included in the student's curriculum.

Optional Activities and Resources (O)

These are suggested high-interest activities to help deliver learning objectives to students or to let students achieve objectives in an applied context. Select as many as you wish to use. Some activities use extra resources for further information about unit content. You can make them available in the classroom for in-depth study or optional activities, but their use is not required for meeting CIMC unit objectives.

FOCUS ASSIGNMENTS

Prereading

- Have students read, "Determining the Sex of Chicks" on page two of *Ostrich Production*, by Joe Berry, OSU Extension Facts No. 3988.

Writing

- Have students write a paragraph about how the factsheet information compares to their experiences and knowledge of livestock production.

GENERAL INSTRUCTIONS

Assignment Sheets

R Review the directions and any specific guidelines.

R Make certain that any needed materials from the Instructor's Resource Package are available.

R Have the students complete the Assignment Sheet. Evaluate each student's performance and provide reteaching and retesting as necessary. Have the students repeat the Assignment Sheet until they achieve mastery.

R Complete each student's Competency Profile.

O Have the students volunteer to read aloud the directions and any special guidelines.

O Return the completed Assignment Sheets to the students so that they may use them for later reference if needed.

Job Sheets

R Review the introduction and evaluation criteria for the Job Sheet. Remind the students that they should not fill in the blanks in the Yes/No columns.

R Review and explain all general guidelines, safety cautions, and warnings.

R Make sure that all tools, equipment, and supplies are available.

R Demonstrate each of the procedures outlined in the Job Sheet.

R Allow the students to practice the Job Sheet skills before skills testing. Coach, correct, and supervise as necessary.

R Have the students complete the Job Sheet. Evaluate each student's performance and provide remediation as necessary. Have the students repeat the Job Sheet until they achieve mastery.

R Complete each student's Competency Profile.

R Return the completed Job Sheets to the students so that they may use them for later reference if needed.

O Have the students volunteer to read aloud the job guidelines, cautions, and warnings.

LAP Sheets

The LAP Sheets are an optional component that can be used to individualize instruction. The following instructions should be followed only if you are using the LAP Sheets.

- R Explain the specific procedures to be followed to the students before they begin using the LAP Sheet. Be sure that each student understands the procedures for using the LAP Sheet.
- R If you want the student to complete any of the assignments on the LAP Sheet that are labeled optional, assign these to the student. Be sure to provide any needed resources.

OBJECTIVE 1

Choose the word or phrase to complete statements about reproduction.

- O Review information on estrus from B-1, "Selecting and Breeding Livestock."
- O Show pertinent sections of *Beef Reproduction I* or *Swine Reproduction I* or other videos discussing reproductive organs and processes.
- O Obtain reproductive tracts from a slaughterhouse and from a poultry processing facility.

OBJECTIVE 2

Label components of the male reproductive tract.

- R Use Transparency Master 1 to identify components of the male reproductive tract.
- R Teach objectives 2 and 3 together.

OBJECTIVE 3

Match male reproductive organs to their functions.

- O Display Transparency Master 1 as organs and functions are discussed.

OBJECTIVE 4

Label components of the reproductive tracts of a cow and a sow.

- R Use Transparency Masters 2 and 3 to identify components of the reproductive tracts of a cow and a sow.
- R Teach objectives 4 and 5 together.

OBJECTIVE 5 — **Match female reproductive organs to their functions.**

[O] Display Transparency Masters 2 and 3 as organs and functions are discussed.

OBJECTIVE 6 — **Choose the word or phrase to complete statements about poultry reproductive systems.**

[R] Use Transparency Masters 4 and 5 to identify components of the male and female poultry reproductive systems.

OBJECTIVE 7 — **Compare the reproductive systems of various animals. (Assignment Sheet)**

[R] Introduce students to library and classroom references and other available information sources.

[R] See the general instructions for all Assignment Sheets.

OBJECTIVE 8 — **Match hormones to their functions.**

[O] Have students research hormones used in livestock production, such as BGH.

EVALUATION

Pretest

- Use the unit Written Test for *both* the pretest and posttest. Give the students the pretest before they begin the unit.
- You may wish to use the CIMC publication *Measuring Learning and Competency Gains: The Pretest/Posttest Approach* for instructions and suggestions on giving pretests and using the results. Information for ordering this material is included in the optional resources section.
- Use pretest results to guide individual students in progressing through the unit, doing enrichment work, or moving to the next unit.

Focus Assignment

- Use an informal evaluation of the focus assignments as a diagnostic tool for determining if any students need extra help in reading comprehension or writing skills. Refer these students to their English instructor, Learning Resource Center, or Educational Enhancement Center.

Assignment Sheet

- Evaluate students on Assignment Sheet activities. Students must repeat an Assignment Sheet until they have mastered the activity.
- Complete each student's Competency Profile.

Skill Test

- Explain to the students that they will be asked to demonstrate the procedures on the Job Sheets as a skills test.
- Describe the rating scale used on the skills test.
- Reteach and retest as necessary.
- Complete each student's Competency Profile.

Posttest

- After they have completed the unit, give students the Written Test again.
- Explain to the students that they will be asked to demonstrate on the Written Test actions listed in the specific objectives.
- You may wish to use the CIMC publication *Measuring Learning and Competency Gains: The Pretest/Posttest Approach* for instructions and suggestions on giving posttests and using the results. Information for ordering this material is included in the optional resources section.
- Reteach and retest as necessary to meet individual student needs and state standards for student learning and competency gains.
- Complete the appropriate sections of the Competency Profiles.
- Review individual and group performance to evaluate teaching effectiveness. Adjust scope, sequence, or instructional methods for additional lessons as required.

REQUIRED RESOURCES

The items marked with an asterisk are included in the Instructor's Resource Package.

Publications

- Berry, Joe, *Ostrich Production.* OSU Extension Facts No. 3988, Stillwater, OK: Oklahoma State University, 1989.

OPTIONAL RESOURCES

Publications

- *Measuring Learning and Competency Gains: The Pretest/Posttest Approach.* Stillwater, OK: CIMC, Oklahoma Department of Vocational and Technical Education, 1992. For ordering information call 800-522-5810.

Videos

- Relevant sections of *Beef Reproduction-II* and *Swine Reproduction-II.* Creative Educational Video, P.O. Box 65265, Lubbock, TX, 79424-5265, 800-922-9965. (VHS)

- *Sheep Reproduction and Management Programs.* Prentice-Hall Media, 150 White Plains Rd., Tarrytown, NY 10591. (sound filmstrip)

Other Media

- Nasco-Guard® Preserved Reproductive Tract of a Cow. Nasco-Fort Atkinson, 901 Janesville Ave., P.O. Box 901, Fort Atkinson, WI 53538-0901; 800-558-9595, FAX 414-563-8296.

UNIT REFERENCES

Publications

- Barrick, R. Kirby and Hobart L. Harmon. *Animal Production and Management.* New York: Gregg Division, McGraw-Hill Book Company, 1988.

- Gillespie, James R. *Modern Livestock & Poultry Production,* (4th ed.). Albany, NY: Delmar Publishers Inc., 1992.

- Patton, Bob. *Vocational Agriculture II.* Stillwater, OK: CIMC, Oklahoma Department of Vocational and Technical Education, 1978.

- Price, David P. *Modern Agriculture: Science, Finance, Production, and Economics.* University Park, NM: SWI Publishing, 1989.

ASSIGNMENT SHEETS

OBJECTIVE 7

Assignment Sheet

Answers will vary.

WRITTEN TEST

OBJECTIVE 1

1.	B	6.	B
2.	A	7.	A
3.	C	8.	D
4.	D	9.	C
5.	A	10.	A

OBJECTIVE 2

1. prostate
2. Cowpers glands
3. retractor penis muscle
4. penis
5. spermatic cord
6. head of epididymis
7. scrotum
8. testicles
9. sheath
10. bladder
11. ampulla
12. vesicular gland

OBJECTIVE 3

1.	D	6.	K	11.	E
2.	L	7.	I	12.	Q
3.	N	8.	A	13.	S
4.	J	9.	M		
5.	P	10.	O		

OBJECTIVE 4

cow

1. left horn of uterus
2. right horn of uterus
3. ovary
4. cervix
5. vagina
6. vulva
7. clitoris
8. uterus
9. fimbria
10. ovary
11. fallopian tube

sow

1. uterine horns
2. cervix
3. urinary bladder
4. anus
5. vaginal orifice
6. clitoris
7. vagina
8. uterine body
9. fallopian tube
10. ovary
11. broad ligament

OBJECTIVE 5

1.	N	6.	P
2.	C	7.	G
3.	J	8.	M
4.	D	9.	I
5.	H		

OBJECTIVE 6

1.	A	6.	C	11.	A
2.	D	7.	A	12.	C
3.	B	8.	B	13.	C
4.	C	9.	B		
5.	A	10.	C		

OBJECTIVE 7

Evaluated on the Assignment Sheet.

OBJECTIVE 8

1.	L	6.	J
2.	G	7.	M
3.	O	8.	K
4.	C	9.	N
5.	F		

CIMC
TEST CODE SHEET

VOCATIONAL PROGRAM (BOOK TITLE) ANIMAL SCIENCE

UNIT NUMBER AND TITLE B-2 – REPRODUCTIVE ORGANS

TOTAL NUMBER OF TEST QUESTIONS 88

TOTAL NUMBER OF BASIC SKILL QUESTIONS 88

OBJECTIVE NUMBER	TEST QUESTION NUMBER(S)	BASIC SKILL CODE(S)
1	1-10	S
2	1-12	S
3	1-13	S
4	Cow 1-11, Sow 1-11	S
5	1-9	S
6	1-13	S
7	Evaluated on the Assignment Sheet	
8	1-9	S
	116	

INSTRUCTOR'S GUIDE	*ARTIFICIAL INSEMINATION*	**B-3**

Required Activities and Resources (R)

These are fully integrated components of this CIMC curriculum. They are usually packaged in or with the curriculum and are essential in meeting the learning objectives. To individualize this unit, use the LAP Sheet supplied in your resources.

- Reproducible Handouts and Transparency Masters are included in the Instructor's Resource Package. Handouts should be copied for all students. Transparency Masters should be used to make overhead transparencies for use during instruction. A small copy of each Transparency Master appears in the student's Information Sheets.

- Non-reproducible resources are included in the student's curriculum.

Optional Activities and Resources (O)

These are suggested high-interest activities to help deliver learning objectives to students or to let students achieve objectives in an applied context. Select as many as you wish to use. Some activities use extra resources for further information about unit content. You can make them available in the classroom for in-depth study or optional activities, but their use is not required for meeting CIMC unit objectives.

FOCUS ASSIGNMENTS

Prereading

Have students read, *Heat Detection Aids for Dairy and Beef A.I.*, by Glenn Selk, OSU Extension Facts No. 4154.

Writing

Have students write a short essay (one paragraph to one page) about the importance of accurate heat detection.

GENERAL INSTRUCTIONS

Assignment Sheets

R Review the directions and any specific guidelines.

- [R] Make certain that any needed materials from the Instructor's Resource Package are available.
- [R] Have the students complete the Assignment Sheet. Evaluate each student's performance and provide reteaching and retesting as necessary. Have the students repeat the Assignment Sheet until they achieve mastery.
- [R] Complete each student's Competency Profile.
- [O] Have the students volunteer to read aloud the directions and any special guidelines.
- [O] Return the completed Assignment Sheets to the students so that they may use them for later reference if needed.

Job Sheets

- [R] Review the introduction and evaluation criteria for the Job Sheet. Remind the students that they should not fill in the blanks in the Yes/No columns.
- [R] Review and explain all general guidelines, safety cautions, and warnings.
- [R] Make sure that all tools, equipment, and supplies are available.
- [R] Demonstrate each of the procedures outlined in the Job Sheet.
- [R] Allow the students to practice the Job Sheet skills before skills testing. Coach, correct, and supervise as necessary.
- [R] Have the students complete the Job Sheet. Evaluate each student's performance and provide remediation as necessary. Have the students repeat the Job Sheet until they achieve mastery.
- [R] Complete each student's Competency Profile.
- [R] Return the completed Job Sheets to the students so that they may use them for later reference if needed.
- [O] Have the students volunteer to read aloud the job guidelines, cautions, and warnings.

LAP Sheets

The LAP Sheets are an optional component that can be used to individualize instruction. The following instructions should be followed only if you are using the LAP Sheets.

R Explain the specific procedures to be followed to the students before they begin using the LAP Sheet. Be sure that each student understands the procedures for using the LAP Sheet.

R If you want the student to complete any of the assignments on the LAP Sheet that are labeled optional, assign these to the student. Be sure to provide any needed resources.

OBJECTIVE 1

Choose the word or phrase to complete statements about artificial insemination.

R Use Transparency Masters 1 and 2 to discuss the speculum and retrovaginal insemination technique.

O Show the pertinent portion of *Beef Reproduction II, Swine Reproduction II,* or other video demonstrating AI techniques.

O Visit an artificial insemination company to observe semen collection, semen processing, and artificial insemination.

O Make available to students information on schools that offer artificial insemination courses.

OBJECTIVE 2

Describe how AI equipment is used.

R Display and demonstrate AI equipment.

O Visit an artificial insemination company to view how AI equipment is used.

OBJECTIVE 3

List factors that contribute to poor conception rates.

O Invite a breeder to discuss his or her personal experience with factors that affect conception rates.

OBJECTIVE 4

Choose the word or phrase to complete statements about semen.

O Obtain straws, ampules, and semen samples and compare color, consistency, smell, and other characteristics.

OBJECTIVE 5

Choose the word or phrase to complete statements about semen cells.

- O Have students examine sperm under a microscope and identify the parts of the cell. Check with a biology teacher about preparing the slides.

OBJECTIVE 6

Choose the word or phrase to complete statements about standards and sources.

- O Have students research the current cost of producing one straw of semen and the selling price of semen from various bulls.
- O Have students write to CSS (Certified Semen Service, a division of the National Association of Animal Breeders) requesting information on AI.
- O Have students find out when and where AI technician courses are available.
- O Have students write to breed associations requesting information on EPDs (Expected Progeny Differences)

OBJECTIVE 7

Match methods of thawing semen in straws and ampules to their descriptions.

- O Prepare a demonstration and show the students some of the techniques.

OBJECTIVE 8

Examine semen for viability and abnormalities. (Assignment Sheet)

- R See the general instructions for all Assignment Sheets. Check with a biology teacher about preparing the slides.

OBJECTIVE 9

Discuss the importance of the estrous cycle in AI.

- R Use Transparencies 3 and 4 to discuss the importance of the estrous cycle in AI.

OBJECTIVE 10

Match the percentage of pregnancies expected to the number of services when using AI in cattle.

- O Invite an AI technician to discuss pregnancy success rates and factors that affect successful fertilization.

OBJECTIVE 11

State reasons cattle do not settle.

- O Research reasons why ovulation may fail or be delayed and the nutritional deficiencies that can interrupt the estrous

OBJECTIVE 12 **State standard practices for using AI.**

O Visit an AI facility to observe standard practices.

OBJECTIVE 13 **List errors in placing the inseminating tube in a cow.**

R Use Transparency 5 to discuss errors in placing the inseminating tube in a cow.

O Invite an AI technician to discuss errors in placing the inseminating tube and how he or she reduces the likelihood of errors.

OBJECTIVE 14 **Inseminate a reproductive tract. (Job Sheet)**

R See the general instructions for all Job Sheets.

O If desired, photocopy the Handout, demonstrate inseminating a cow and lead students through the procedure.

EVALUATION

Pretest

- Use the unit Written Test for *both* the pretest and posttest. Give the students the pretest before they begin the unit.
- You may wish to use the CIMC publication *Measuring Learning and Competency Gains: The Pretest/Posttest Approach* for instructions and suggestions on giving pretests and using the results. Information for ordering this material is included in the optional resources section.
- Use pretest results to guide individual students in progressing through the unit, doing enrichment work, or moving to the next unit.

Focus Assignment

- Use an informal evaluation of the focus assignments as a diagnostic tool for determining if any students need extra help in reading comprehension or writing skills. Refer these students to their English instructor, Learning Resource Center, or Educational Enhancement Center.

Assignment Sheet

- Evaluate students on Assignment Sheet activities. Students must repeat an Assignment Sheet until they have mastered the activity.
- Complete each student's Competency Profile.

Skill Test

- Explain to the students that they will be asked to demonstrate the procedures on the Job Sheets as a skills test.
- Describe the rating scale used on the skills test.
- Reteach and retest as necessary.
- Complete each student's Competency Profile.

Posttest

- After they have completed the unit, give students the Written Test again.
- Explain to the students that they will be asked to demonstrate on the Written Test actions listed in the specific objectives.
- You may wish to use the CIMC publication *Measuring Learning and Competency Gains: The Pretest/Posttest Approach* for instructions and suggestions on giving posttests and using the results. Information for ordering this material is included in the optional resources section.
- Reteach and retest as necessary to meet individual student needs and state standards for student learning and competency gains.
- Complete the appropriate sections of the Competency Profiles.
- Review individual and group performance to evaluate teaching effectiveness. Adjust scope, sequence, or instructional methods for additional lessons as required.

REQUIRED RESOURCES

The items marked with an asterisk are included in the Instructor's Resource Package.

Publications

- Selk, Glenn. *Heat Detection Aids for Dairy and Beef A.I.*, OSU Extension Facts No. 4154. Stillwater, OK: Oklahoma State University, n.d.

OPTIONAL RESOURCES

Publications

- Publications of the Cooperative Extension Service, Division of Agriculture, Oklahoma State University
  - F3607, *Using Fresh and Frozen Semen in a Swine A.I. Program*
- *Measuring Learning and Competency Gains: The Pretest/Posttest Approach.* Stillwater, OK: CIMC, Oklahoma Department of Vocational and Technical Education, 1992. For ordering information call 800-522-5810.
- *The Merck Veterinary Manual*, (7th ed.). Rahway, NJ: Merck & Co., Inc., 1991.
- *NASCO Agricultural Sciences Catalog.* Nasco-Fort Atkinson, 901 Janesville Ave., P.O. Box 901, Fort Atkinson, WI 53538-0901; 800-558-9595, FAX 414-563-8296.
  - See the section on artificial insemination for supplies, equipment, and tools; has good photos of inseminating equipment for cattle, sheep, swine, and poultry.
  - Carl L. Ruppel and Harold J. Hill. *Study of Bovine Semen* and *Study Course in Animal Reproduction.*

Videos

- *Beef Reproduction II*, and *Swine Reproduction II.* Lubbock, TX: Creative Educational Video, 1987. For ordering information call 800-922-9965. VHS.

Other Media

- *NASCO Agricultural Sciences Catalog.* Nasco-Fort Atkinson, 901 Janesville Ave., P.O. Box 901, Fort Atkinson, WI 53538-0901; 800-558-9595, FAX 414-563-8296.
  - Training cow
  - Nasco-Guard preserved reproductive tract of a cow
  - Universal trainer

UNIT REFERENCES

Publications

- Barrick, R. Kirby and Hobart L. Harmon. *Animal Production and Management.* New York: Gregg Division, McGraw-Hill Book Company, 1988.
- Bearden, H. Joe, and John W. Fuquay. *Applied Animal Reproduction.* Englewood Cliffs, NJ: Prentice Hall, 1992.
- Burton, Clifford H. and Milton E. Wells. *Selection of A.I. Sires for the Dairy Herd,* OSU Extension Facts No. 4152. Stillwater, OK: Oklahoma State University, n.d.
- Cooper, Elmer L. *Agriscience Fundamentals & Applications.* Albany, NY: Delmar Publishers Inc., 1990.
- Cooper, Elmer L. *Agricultural Mechanics: Fundamentals & Applications,* (2nd ed.). Albany, NY: Delmar Publishers Inc., 1992.
- Cullen, Patrick T. *Applied Farm Animal Health: A Practical Guide.* Great Britain: Pergamon Press, 1991.
- Ensminger, M.E. *Animal Science Digest,* (1st ed.). Danville, IL: Interstate Publishers, Inc., 1991.
- Ensminger, M.E. *The Stockman's Handbook,* (7th ed.). Danville, IL: Interstate Publishers, Inc., 1992.
- Gillespie, James R. *Modern Livestock & Poultry Production,* (4th ed.). Albany, NY: Delmar Publishers Inc., 1992.
- Herren, Ray V. and Roy L. Donahue. *The Agriculture Dictionary.* Albany, New York: Delmar Publishers, Inc., 1991.

- Pierce, Greg. *Agricultural Livestock Skills*. Stillwater, OK: CIMC, Oklahoma Department of Vocational and Technical Education, 1979.

- Selk, Glenn. *Embryo Transfer in Cattle*, OSU Extension Facts No. 3158. Stillwater, OK: Oklahoma State University, n.d.

- Selk, Glenn. *Heat Detection Aids for Dairy and Beef A.I.*, OSU Extension Facts No. 4154. Stillwater, OK: Oklahoma State University, n.d.

ANSWERS

ARTIFICIAL INSEMINATION

B-3

ASSIGNMENT SHEETS

OBJECTIVE 8

Assignment Sheet.

Answers will vary depending on the semen sample provided to the student. The lab sheet should be complete.

WRITTEN TEST

OBJECTIVE 1

1.	D	6.	A
2.	B	7.	B
3.	D	8.	D
4.	A	9.	D
5.	C	10.	B

OBJECTIVE 2

1. **nitrogen chest** – used to store straws and/or ampules
2. **thaw box** – used to thaw straws and/or ampules
3. **inseminating gun** – used to deposit semen in uterus (when using semen stored in a straw)
4. **polybulb** – used to draw semen from straw and to deposit semen in uterus (when using semen stored in an ampule)
5. **straw clippers** – used to snip off the end of the straw
6. **straw** – used to store semen
7. **ampule** – used to store semen
8. **inseminating tube** – used to deposit semen in uterus (when using semen stored in an ampule)

9. **speculum** – used to open the reproductive tract as far as the cervix

OBJECTIVE 3

Answer must include all five of the following, in any order.

- improper timing
- diseases
- poor insemination technique
- management failure
- ovulation failure

OBJECTIVE 4

1. C
2. B
3. C
4. D
5. C
6. A

OBJECTIVE 5

1. B
2. A
3. C
4. D
5. C

OBJECTIVE 6

1. B
2. D
3. B
4. D
5. C
6. D

OBJECTIVE 7

1. G
2. A
3. E
4. J
5. H
6. G

OBJECTIVE 8

Evaluated on the Assignment Sheet.

OBJECTIVE 9

1. Mary should be inseminated between 9:00 a.m. and 5:00 p.m. on March 7th.

   Additionally, the answer must include all of the following, in any order:

   - optimal time for AI is 9 to 24 hours after the start of estrus
   - the egg can only survive for a few hours after being released from the ovary
   - insemination must occur prior to ovulation

2. Carol should inseminate Sally, the sow, between 10:00 a.m. to 8:00 p.m. on July 11th.

   Additionally, the answer must include all of the following, in any order:

   - optimal time for AI is 25 to 35 hours after the start of estrus
   - the egg can only survive for a few hours after being released from the ovary
   - insemination must occur prior to ovulation

OBJECTIVE 10

1. B
2. E
3. H

OBJECTIVE 11

Answer must include any six of the following, in any order:

- ovulation failure
- delayed ovulation
- defective sperm
- the failure of the follicle to rupture and release the egg
- nutritional deficiencies interrupting the estrous cycle
- disease
- physical defects

OBJECTIVE 12

Answer must include any six of the following, in any order:

- Check with breed associations regarding the use of AI.
- Check animals twice a day to detect females in heat (once in the morning and once in the evening).
- Provide good handling facilities.
- Handle the animals gently.
- Use a qualified technician to inseminate animals.
- Inseminate animals within the optimum breeding time.
- Use a good identification system and keep accurate records of the breeding date and the birthing date.

OBJECTIVE 13

Answer must include all five of the following, in any order:

- placing the tube in the blind cavity of the cervix
- placing the tube in the urethra
- placing the tube in the fold of the vaginal wall
- pushing the tube too far into the uterus so the sperm is deposited in one uterine horn
- letting the tube slip back into the cervix

OBJECTIVE 14

Evaluated on Job Sheet.

CIMC
TEST CODE SHEET

VOCATIONAL PROGRAM (BOOK TITLE) ANIMAL SCIENCE

UNIT NUMBER AND TITLE B-3 – ARTIFICIAL INSEMINATION

TOTAL NUMBER OF TEST QUESTIONS 66

TOTAL NUMBER OF BASIC SKILL QUESTIONS 41

OBJECTIVE NUMBER	TEST QUESTION NUMBER(S)	BASIC SKILL CODE(S)
1	1-10	X
2	1-7	W
3	1-5	W
4	1, 5, 6	S
4	2, 4	X
5	1-5	S
6	1-6	X
7	1-6	X
8	Evaluated on the Assignment Sheet	
9	1, 2	W, M , S
10	1-3	S
11	1-5	W, S
12	1-6	W
13	1-5	W
14	Evaluated on the Job Sheet	

Required Activities and Resources (R)

These are fully integrated components of this CIMC curriculum. They are usually packaged in or with the curriculum and are essential in meeting the learning objectives. To individualize this unit, use the LAP Sheet supplied in your resources.

- Reproducible handouts and Transparency Masters are included in the Instructor's Resource Package. Handouts should be copied for all students. Transparency Masters should be used to make overhead transparencies for use during instruction. A small copy of each Transparency Master appears in the student's Information Sheets.
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Optional Activities and Resources (O)

These are suggested high-interest activities to help deliver learning objectives to students or to let students achieve objectives in an applied context. Select as many as you wish to use. Some activities use extra resources for further information about unit content. You can make them available in the classroom for in-depth study or optional activities, but their use is not required for meeting CIMC unit objectives.

FOCUS ASSIGNMENTS

Prereading

R Have students read, *Fertility Testing Rams Increases Profits*, by Gerald Q. Fitch, OSU Extension Facts No. CR-3803.

Writing

R Have students look up and write definitions for *motility*, *morphology*, and *epididymis*. Have them write a short essay (one paragraph to one page) about how fertility testing increases profitability.

GENERAL INSTRUCTIONS

Assignment Sheets

- R Review the directions and any specific guidelines.
- R Make certain that any needed materials from the Instructor's Resource Package are available.
- R Have the students complete the Assignment Sheet. Evaluate each student's performance and provide reteaching and retesting as necessary. Have the students repeat the Assignment Sheet until they achieve mastery.
- R Complete each student's Competency Profile.
- O Have the students volunteer to read aloud the directions and any special guidelines.
- O Return the completed Assignment Sheets to the students so that they may use them for later reference if needed.

Job Sheets

- R Review the introduction and evaluation criteria for the Job Sheet. Remind the students that they should not fill in the blanks in the Yes/No columns.
- R Review and explain all general guidelines, safety cautions, and warnings.
- R Make sure that all tools, equipment, and supplies are available.
- R Demonstrate each of the procedures outlined in the Job Sheet.
- R Allow the students to practice the Job Sheet skills before skills testing. Coach, correct, and supervise as necessary.
- R Have the students complete the Job Sheet. Evaluate each student's performance and provide remediation as necessary. Have the students repeat the Job Sheet until they achieve mastery.
- R Complete each student's Competency Profile.
- R Return the completed Job Sheets to the students so that they may use them for later reference if needed.
- O Have the students volunteer to read aloud the job guidelines, cautions, and warnings.

LAP Sheets

The LAP Sheets are an optional component that can be used to individualize instruction. The following instructions should be followed only if you are using the LAP Sheets.

R Explain the specific procedures to be followed to the students before they begin using the LAP Sheet. Be sure that each student understands the procedures for using the LAP Sheet.

R If you want the student to complete any of the assignments on the LAP Sheet that are labeled optional, assign these to the student. Be sure to provide any needed resources.

OBJECTIVE 1

Choose the word or phrase to complete statements about fertility and pregnancy testing.

R Show Transparency 1 and review the parts of the cow's reproductive tract.

O Invite a successful livestock manager to participate in a class discussion.

OBJECTIVE 2

Discuss methods of pregnancy testing.

O Review the sow and ewe reproductive tracts using the appropriate transparencies from Unit B-2, "Reproductive Organs."

O Display the equipment used for various pregnancy testing techniques.

O Arrange a trip to observe techniques at a clinic.

OBJECTIVE 3

Develop a chart showing pregnancy testing methods of different species. (Assignment Sheet)

R See the general instructions for all Assignment Sheets.

O Encourage students to check additional sources for information to include in their charts. Make texts and animal science references available; suggest they use the local library.

O Show the sections of *Beef Reproduction II* and *Swine Reproduction II* that cover pregnancy testing.

OBJECTIVE 4 — **List indications of pregnancy in a rectal examination.**

- O Invite a technician or vet to discuss the relative ease of determining pregnancy using the four indicators.

OBJECTIVE 5 — **Pregnancy test a cow using a rectal examination. (Job Sheet)**

- R See the general instructions for all Job Sheets.

OBJECTIVE 6 — **Select information about the stages of pregnancy.**

- R Use Transparency 2 to discuss the stages of pregnancy.
- O Invite a technician or vet to discuss their experiences in determining the stage of pregnancy.
- O Examine preserved fetuses in different stages of development.
- O Visit a local ranch and perform rectal palpations on cows in various stages of pregnancy.
- O Show the sections of the video *Beef Reproduction III* and *Swine Reproduction II* that show the stages of pregnancy and fetal development.

OBJECTIVE 7 — **Discuss fertility testing in males.**

- O Visit a semen collection facility.
- O Have students view semen samples under a microscope.
- O Review applicable objectives in Unit B-3, "Artificial Insemination."

EVALUATION

Pretest

- Use the unit Written Test for *both* the pretest and posttest. Give the students the pretest before they begin the unit.
- You may wish to use the CIMC publication *Measuring Learning and Competency Gains: The Pretest/Posttest Approach* for instructions and suggestions on giving pretests and using the results. Information for ordering this material is included in the optional resources section.
- Use pretest results to guide individual students in progressing through the unit, doing enrichment work, or moving to the next unit.

Focus Assignment

- Use an informal evaluation of the focus assignments as a diagnostic tool for determining if any students need extra help in reading comprehension or writing skills. Refer these students to their English instructor, Learning Resource Center, or Educational Enhancement Center.

Assignment Sheet

- Evaluate students on Assignment Sheet activities. Students must repeat an Assignment Sheet until they have mastered the activity.
- Complete each student's Competency Profile.

Skill Test

- Explain to the students that they will be asked to demonstrate the procedures on the Job Sheets as a skills test.
- Describe the rating scale used on the skills test.
- Reteach and retest as necessary.
- Complete each student's Competency Profile.

Posttest

- After they have completed the unit, give students the Written Test again.
- Explain to the students that they will be asked to demonstrate on the Written Test actions listed in the specific objectives.
- You may wish to use the CIMC publication *Measuring Learning and Competency Gains: The Pretest/Posttest Approach* for instructions and suggestions on giving posttests and using the results. Information for ordering this material is included in the optional resources section.
- Reteach and retest as necessary to meet individual student needs and state standards for student learning and competency gains.
- Complete the appropriate sections of the Competency Profiles.

- Review individual and group performance to evaluate teaching effectiveness. Adjust scope, sequence, or instructional methods for additional lessons as required.

REQUIRED RESOURCES

The items marked with an asterisk are included in the Instructor's Resource Package.

Publications

Fitch, Gerald Q. *Fertility Testing Rams Increases Profits*, OSU Extension Facts No. CR-3803. Stillwater, OK: Oklahoma State University, n.d.

OPTIONAL RESOURCES

Publications

- *Measuring Learning and Competency Gains: The Pretest/Posttest Approach.* Stillwater, OK: CIMC, Oklahoma Department of Vocational and Technical Education, 1992. For ordering information call 800-522-5810.

- *The Merck Veterinary Manual*, (7th ed.). Rahway, NJ: Merck & Co., Inc. 1991.

- *Dairy Cattle Fertility and Sterility. NASCO Agricultural Sciences Catalog.* Nasco-Fort Atkinson, 901 Janesville Ave., P.O. Box 901, Fort Atkinson, WI 53538-0901; 800-558-9595, FAX 414-563-8296.

- OSU Extension Publications. Stillwater, Oklahoma: Oklahoma State University (F=Fact Sheet, E=Circular, T=Technical Report, CR=Current Report):

  - F-3660 *Oklahoma Boar Testing Program*
  - CR-3862 *The National Sheep Improvement Program*
  - F-4153 *Reproductive Efficiency in Dairy Cattle*

Videos

- Relevant sections of *Beef Reproduction II* (pregnancy diagnosis, the developing ovum, reproductive tracts from different stages of pregnancy), *Beef Reproduction III* (fetuses at various stages of development, palpation), and *Swine Reproduction II* (pregnancy diagnosis, embryo, and fetus development). Creative Educational Video, P.O. Box 65265, Lubbock, TX, 79424-5265, 800-922-9965. (VHS)

- *Semen Collection and Processing – Beef or Dairy. NASCO Agricultural Sciences Catalog.* Nasco-Fort Atkinson, 901 Janesville Ave., P.O. Box 901, Fort Atkinson, WI 53538-0901; 800-558-9595, FAX 414-563-8296.

Other Media

- Pig embryos, test cow. *NASCO Agricultural Sciences Catalog.* Nasco-Fort Atkinson, 901 Janesville Ave., P.O. Box 901, Fort Atkinson, WI 53538-0901; 800-558-9595, FAX 414-563-8296.

UNIT REFERENCES

Publications

- Barrick, R. Kirby and Hobart L. Harmon. *Animal Production and Management.* New York: Gregg Division, McGraw-Hill Book Company, 1988.
- Bearden, H. Joe, and John W. Fuquay. *Applied Animal Reproduction.* Englewood Cliffs, NJ: Prentice Hall, 1992.
- Blowey, R.S. *Veterinary Book for Dairy Farmers.* Great Britain: Farming Press, Ltd., 1990.
- Brown, Dave, and Sam Meadowcroft. *The Modern Shepherd.* Great Britain: Farming Press, Ltd., 1989.
- Ensminger, M.E. *Sheep and Goat Science.* Danville, IL: Interstate Publishers, Inc., 1985.
- Ensminger, M.E. *The Stockman's Handbook.* Danville, IL: Interstate Publishers, Inc., 1992.
- Hafez, E.S.E. *Reproduction in Farm Animals.* Philadelphia: Lea & Febiger, 1987.
- Gillespie, James R. *Modern Livestock & Poultry Production,* (4th ed.). Albany, NY: Delmar Publishers Inc., 1992.
- Pond, W.G., and J.H. Maner. *Swine Production and Nutrition.* Westport, CT: AVI Publishing Company, Inc., 1984.
- Taylor, Robert E. *Beef Production and the Beef Industry.* Minneapolis, MN: Burgess Publishing Co., 1984.

ASSIGNMENT SHEET

OBJECTIVE 3

Assignment Sheet

Part 1

Answers may vary, but should be neat, easy to read, and have an appropriate title and column headings as shown below.

Pregnancy Testing for Cows, Sows, and Ewes

Animal	Types of Pregnancy Tests	Most Common Method	Time Performed After Breeding (in days)
Cow	1. Rectal palpation 2. Analysis of progesterone	Rectal palpation	42
Ewe	1. Ultrasonic scanning 2. Rectal Doppler 3. Rectal-abdominal palpation	Ultrasonic scanning	51-70
Sow	Ultrasonic scanning	Ultrasonic scanning	35

Part 2

1. after May 20
2. No. Fred tested his cows only 19 days after breeding. For the test to be accurate, he would have to test 35-42 days after breeding.
3. a. between July 21 and August 9

   b. ultrasonic scanning
4. Mark can't use rectal palpation with sows. He must use ultrasonic scanning.

WRITTEN TEST

OBJECTIVE 1

1. B
2. B
3. B
4. C
5. D
6. B
7. C

OBJECTIVE 2

1. a. rectal palpation

   b. after 42 days from breeding

2. progesterone

3. Answer should include all the following:

   - ultrasonic scanning
   - rectal Doppler technique
   - rectal-abdominal palpation

4. a. after May 5

   b. A small, portable ultrasonic scanner passes sound waves through the body. The scanner uses echoes to determine pregnancy.

5. Insert your hand into the rectum in order to palpate the uterus through the wall of the rectum.

6. low – A ewe should be tested 51 to 70 days after breeding.

7. A rod, 16 inches long, is inserted into the ewe's rectum. The rod is pushed towards the abdominal wall where the technician palpates the reproductive organs through the ewe's skin.

OBJECTIVE 3

Evaluated on the Assignment Sheet.

OBJECTIVE 4

Answer should include all of the following, in any order:

- The membrane of the sac will slip in your fingers when you manipulate the fetus through the uterine wall.
- Check for the presence and size of cotyledons.
- Check for the presence of the fetus.
- The diameter of the uterine artery increases, making it possible to detect a pulse (Fremitus).

OBJECTIVE 5

Evaluated on the Job Sheet.

OBJECTIVE 6

Part 1

1. C
2. A
3. B
4. B
5. C
6. B
7. D
8. C
9. A

Part 2

1. C
2. A
3. C

Part 3

1. C
2. D
3. B

OBJECTIVE 7

1. Answer should include any four of the following, in any order:
   - low quality semen
   - physical defects and injuries
   - psychological condition
   - infection and disease
   - poor management and feeding
   - inherited abnormalities
2. a. semen has a good density
   b. can settle most females
3. a. semen has a single or combination of low values for density, mobility, and rate of movement
   b. can settle few, if any, females
4. just prior to the breeding season to identify sterile or near-sterile males before they are expected to settle females; and soon after the breeding season because heavy service temporarily lowers the semen quality in most males
5. Answer should include all of the following, in any order:
   - artificial vagina
   - electrical stimulation
   - rectal massage of ampullae

CIMC
TEST CODE SHEET

VOCATIONAL PROGRAM (BOOK TITLE) ANIMAL SCIENCE

UNIT NUMBER AND TITLE B-4 – FERTILITY AND PREGNANCY TESTING

TOTAL NUMBER OF TEST QUESTIONS 38

TOTAL NUMBER OF BASIC SKILL QUESTIONS 30

OBJECTIVE NUMBER	TEST QUESTION NUMBER(S)	BASIC SKILL CODE(S)
1	1-4, 6, 7	X
1	5	S
2	1, 3	X
2	2	S
2	4, 6	W, M
2	5, 7	W, S
3	Evaluated on the Assignment Sheet	
4	1-4	S
5	Evaluated on the Job Sheet	
6	Part 1: 1-9, Part 2: 1-3 Part 3: 1-3	S
7	1-5	W, S

INSTRUCTOR'S GUIDE

BIRTH ASSISTANCE

B-5

Required Activities and Resources (R)

These are fully integrated components of this CIMC curriculum. They are usually packaged in or with the curriculum and are essential in meeting the learning objectives. To individualize this unit, use the LAP Sheet supplied in your resources.

- Reproducible Handouts and Transparency Masters are included in the Instructor's Resource Package. Handouts should be copied for all students. Transparency Masters should be used to make overhead transparencies for use during instruction. A small copy of each Transparency Master appears in the student's Information Sheets.
- Non-reproducible resources are included in the student's curriculum.

Optional Activities and Resources (O)

These are suggested high-interest activities to help deliver learning objectives to students or to let students achieve objectives in an applied context. Select as many as you wish to use. Some activities use extra resources for further information about the unit content. You can make them available in the classroom for in-depth study or optional activities, but their use is not required for meeting CIMC unit objectives.

FOCUS ASSIGNMENTS

Prereading

R Have students read one of the following:

- "Understanding Normal Parturition" in *Calving Management*, OSU Cooperative Extension Circular E-906, pages 20-21 and the top of 22.
- "Birth and the Newborn" in *Sheep Health Handbook*, by Thomas R. Thedford, DVM, pages 107-110.
- "Ewe Management" and "Ewe and Lamb Management" in *Sheep Health and Management*, OSU Extension Facts No. 3860

- ☐ Handout 1, "Farrowing" adapted from "Farrowing: Causes and Events," by Dr. Robert P. Wettemann, prepared for the OSU Swine Farrowing School.

Writing

R Have students look up and write the definitions for "parturition" and "dystocia." Have them write a short essay (one paragraph to one page) about their current level of ability and experience and also have them discuss the two areas of birth assistance that will be most interesting or most important to them in this unit.

O Let students share their observations with each other. The calving and lambing reading assignments are similar, but the farrowing assignment details the hormonal chain of events that initiate parturition. Students may divide into groups of three in which each animal is represented. Each group will create a table or chart showing similarities and differences in the three species.

GENERAL INSTRUCTIONS

Assignment Sheets

R Review the directions and any specific guidelines.

R Make certain that any needed materials from the Instructor's Resource Package are available.

R Have the students complete the Assignment Sheet. Evaluate each student's performance and provide reteaching and retesting as necessary. Have students repeat the Assignment Sheets until they achieve mastery. Complete each student's Competency Profile.

O Have students volunteer to read aloud the directions and any special guidelines.

O Return the completed Assignment Sheets to the students so that they may use them for later reference if needed.

Job Sheets

R Review the Introduction and Evaluation Criteria for the Job Sheet.

R Review and explain all general guidelines, safety cautions, and warnings.

- R Review portions of the videos that show the procedures, equipment and supplies, general guidelines, safety cautions, and warnings.
- R Make sure that all tools, equipment, and supplies are available.
- R Demonstrate each of the procedures outlined in the Job Sheet.
- R Allow the students to practice the Job Sheet skills before skills testing. Coach, correct, and supervise as necessary.
- R Have the students complete the Job Sheet. Evaluate each student's performance and provide remediation as necessary. Have the students repeat the Job Sheet until they achieve mastery. Complete each student's Competency Profile.
- R Return the completed Job Sheet to the students so that they may use them for later reference if needed.
- O Have students volunteer to read aloud the job guidelines, cautions, and warnings.

LAP Sheets

The LAP Sheets are an optional component that can be used to individualize instruction. The following instructions should be followed only if you are using the LAP Sheets.

- R Explain the specific procedures to be followed to the students before they begin using the LAP Sheet. Be sure that each student understands the procedures for using the LAP Sheet.
- R If you want the student to complete any of the assignments on the LAP Sheet that are labeled optional, assign these to the student. Be sure to provide any needed resources.

Calving and farrowing schools

- O Each year the Oklahoma State University School of Veterinary Medicine offers a calving school and a farrowing school in Stillwater. If you are not already on their mailing list, you can request information on dates, cost, accommodations, etc.

OBJECTIVE 1

Choose the word or phrase to complete statements about parturition and birth assistance.

- R Discuss the similarities and differences in calving, lambing, and farrowing.
- O Ask students to share their experiences with birth assistance.
- O Show *Fundamental Livestock Parturition, Calving Management: Parturition*, or another video on parturition.

  ☞ **NOTE:** *Calving Management: Parturition* is available from your County Extension Agent.
- O Encourage students to take notes from the video to add to the information for this objective.

  ☞ **NOTE:** During the video, write the counter or timer reading for each section of the objective so you can find them again quickly for review.
- O Make the video available to students for review.
- O Show or make available videos on lambing and farrowing. Show the portion of *Sheep Management Practices I* and/or *Swine Reproduction II*. These sections are short and basic. They will compliment but will not substitute for *Fundamental Livestock Parturition* or *Calving Management: Parturition*.

OBJECTIVE 2

Match the stages of parturition to their characteristics, dams, and types of assistance.

- O Share and have students share observations of Stage I behavior. You can discuss examples of this same behavior in humans.
- O Have students discuss birthing of pets or other animals they have observed.
- O Invite a rancher and/or a vet to discuss the various stages of parturition and the types of assistance that might be required.

OBJECTIVE 3

Discuss dystocia.

- O Discuss dystocia in your own experience and allow students to share their experiences.
- O Discuss the similarities and differences in dystocia with calves, lambs, and pigs.

- [O] Stress the importance of calling a vet in good time.
- [O] Obtain the video *Calving Management: Dystocia* from your County Extension Agent.

  ☞ **NOTE:** During the video write the counter or timer reading for each section of the objective so you can find them again quickly for review.
- [O] Make the video available to students for review.
- [O] Show or make available videos on dystocia in lambing and farrowing. Show the portion of *Sheep Management Practices I* that shows normal lambing and/or *Swine Reproduction II* showing abnormal delivery. These sections are short and basic. They will compliment but will not substitute for *Calving Management: Dystocia.*
- [O] Show *Bovine Parturition by Cesarean Section.*

OBJECTIVE 4

Discuss chemicals and drugs needed to assist with the birthing process.

- [R] Discuss safety when using drugs and chemicals.
- [R] Display examples of the chemicals and drugs used in the birthing process:
  - obstetrical soap
  - lubricant
  - broad-range antibiotic
  - antiseptic
  - disinfectant
  - oxytocin
  - injection supplies (antiseptic, syringe, cotton swabs)
- [R] Teach or review the Information Sheet and Job Sheets 5, 6, and 7 from Unit C-3 "Vaccination and Drugs."
- [R] Demonstrate how to use chemicals and administer drugs.
- [O] Review the portion of *Calving Management: Dystocia* or another video that shows the types of chemicals used and how to use them.
- [O] Let students practice giving injections on oranges.

OBJECTIVE 5 **Identify basic instruments needed to assist with calving difficulties.**

R Display these instruments:

- obstetrical chain or soft rope
- obstetrical handles
- mechanical calf puller

R Discuss each piece of equipment and demonstrate how they are used.

O Review the section of *Calving Management: Dystocia* or another video that demonstrates the use of these instruments.

OBJECTIVE 6 **Describe how to perform a vaginal examination by hand.**

R Demonstrate and allow students to perform a vaginal examination on a cow, ewe, and/or sow.

O Review the portion of *Calving Management: Dystocia* or another video that demonstrates and discusses how to perform the procedure.

OBJECTIVE 7 **Select actions to take for various calving and lambing positions.**

R Use Transparency Masters 1-9 to discuss in detail how to assist in each type of birth.

☛ **NOTE:** The *Sheep Health Handbook* and the OSU Extension Circular *Calving Management* have some additional pictures and discussions you might find useful for teaching this objective.

O Review the portion of *Calving Management: Dystocia* or another video that shows the types of malpresentation and discusses how to assist or when to call the vet.

O Invite an experienced stock manager and/or a veterinarian to discuss assistance for these conditions and others, such as twins.

OBJECTIVE 8 **Assist a cow in calving. (Job Sheet 1)**

R See the general instructions for all Job Sheets.

OBJECTIVE 9 **Assist a ewe in lambing. (Job Sheet 2)**

R See the general instructions for all Job Sheets.

OBJECTIVE 10 **Select normal birth averages for swine.**

- O Refer to gestation information in Unit B-1.

OBJECTIVE 11 **Discuss other farrowing difficulties and the appropriate assistance.**

- O Watch the appropriate section of *Swine Reproduction II* or another video that shows farrowing and cleaning the piglet.

  ☞ **NOTE:** This video does not discuss dystocia, but does discuss some types of assistance that might be required.

- O Give students an opportunity to perform a vaginal examination on a sow before they complete the Job Sheet.

OBJECTIVE 12 **Farrow a sow. (Job Sheet 3)**

- R See the general instructions for all Job Sheets.

OBJECTIVE 13 **Discuss care of the newborn calf, lamb, and piglet.**

- R Discuss similarities and differences in the care of each species.

- R Demonstrate how to stimulate breathing, clear away mucous and membranes, and resuscitate an animal.

- O Review the portion of *Calving Management: Dystocia* or another video that discusses the importance of getting colostrum into the newborn as soon as possible.

- O Review the portion of *Swine Reproduction II* that covers caring for the newborn piglets and a portion of *Sheep Management Practices I* that covers lambs.

- O Have students read and respond to either "Swine Farrowing Units" and "Swine Nursery Units" from the *Pork Industry Handbook* or OSU Fact Sheet "Environmentally Controlled Farrowing and Nursery Housing".

- O Have a contest where students design a farrowing unit. They would draw the floor plans and describe the units. They might work in teams. Add variables such as maximum cost and types of materials they can use.

- O Have students read and respond to selected portions of *Sheep Health and Management.*

- Discuss the basic needs such as warmth, contact with other animals, and attachment to the mother that affect the emotional health of an animal as well as its physical health.

- You may want to incorporate the Information Sheets and Job Sheets in Unit C-5, "Dehorning, Docking, and Castration" and Unit C-6, "Hoof Trimming, Shearing, and Animal Identification" while the newborns are available.

OBJECTIVE 14

Clip newborn piglets' needle teeth. (Job Sheet 4)

- See the general instructions for all Job Sheets.

EVALUATION

Pretest

- Use the unit Written Test for **both** the pretest and posttest. Give the students the pretest before they begin the unit.

- You may wish to use the CIMC publication *Measuring Learning and Competency Gains: The Pretest/Posttest Approach* for instructions and suggestions on giving pretests and using the results. Information for ordering this material is included in the Optional Resources section.

Focus Assignments

- Use an informal evaluation of the focus assignments as a diagnostic tool for determining if any students need extra help in reading comprehension or writing skills. Refer these students to their English instructor, Learning Resource Center, or Educational Enhancement Center.

Assignment Sheet

- Evaluate students on Assignment Sheet activities if not previously done. Students must repeat an Assignment Sheet until they have mastered the activity.

Posttest

- After they have completed the unit, give students the Written Test again.

- Explain to the students that they will be asked to demonstrate on the Written Test actions listed in the specific objectives.

- You may wish to use the CIMC publication *Measuring Learning and Competency Gains: The Pretest/Posttest Approach* for instructions and suggestions on giving pretests and using the results. Information for ordering this material is included in the Optional Resources section.

- Reteach and retest as necessary to meet individual student needs and state standards for student learning and competency gains.

- Complete the appropriate sections of competency profiles.

- Review individual and group performance to evaluate teaching effectiveness. Adjust scope, sequence, or instructional methods for additional lessons as required.

Skill Test

- Explain to the students that they will be asked to demonstrate the procedures on the Job Sheets as a skills test.

- Describe the rating scale used on the skills test.

- Reteach and retest as necessary.

REQUIRED RESOURCES

The items marked with an asterisk are included in the Instructor's Resource Package.

Publications

- Selk, Glenn E., Larry E. Rice, and Sally L. Northcutt. *Calving Management*, Circular E-906, Stillwater, OK: Cooperative Extension Service, Division of Agricultural Sciences and Natural Resources, Oklahoma State University, n.d., pp. 20-22.

- Thedford, Thomas R. et al. *Sheep Health and Management*, OSU Extension Facts No. 3860.

- Thedford, Thomas R. *Sheep Health Handbook: A Field Guide for Producers with Limited Veterinary Services*. Winrock International Informational Services Publication in collaboration with Agricultural Experiment Station, Division of Agriculture, University of Arkansas, 1990, pp. 107-110.

OPTIONAL RESOURCES

Publications

- *Measuring Learning and Competency Gains: The Pretest/Posttest Approach.* Stillwater, OK: CIMC, Oklahoma Department of Vocational and Technical Education, 1992. For ordering information call 800-522-5810.

- *The Merck Veterinary Manual,* (7th ed.). Rahway, NJ: Merck & Co., Inc. 1991.

- *NASCO Agricultural Sciences Catalog.* Nasco-Fort Atkinson, 901 Janesville Ave., P.O. Box 901, Fort Atkinson, WI 53538-0901; 800-558-9595, FAX 414-563-8296.

- Publications of the Cooperative Extension Service, Division of Agriculture, Oklahoma State University, Stillwater, OK (F=Facts Sheet, E=Circular, PIH=Pork Industry Handbook)

  - E-906, *Calving Management*

  - F-3650, *Managing the Sow and Litter*

  - F-1009, *Environmentally Controlled Farrowing and Nursery Housing*

  - PIH-70, Housing-15, *Swine Nursery Units*

  - PIH-10, Housing-1, *Swine Farrowing Units*

Videos

- The following videotapes are produced by the OSU Cooperative Extension Service and are available from your local Extension Agent:

  - VT324, *Calving Management: Parturition.* 23 min.

  - VT323, *Calving Management: Dystocia.* 38 min.

- The following videotapes are available from Creative Educational Video, P.O. Box 65265, Lubbock, TX 79424-5265; 800-922-9965:

  - *Fundamental Livestock Parturition.* 18 min.

  - *Beef Reproduction-III.* 40 min.

  - *Swine Reproduction-II.* 30 min.

- *Sheep Management Practices-I.* 54 min.
- *Bovine Parturition by Cesarean Section.* 21 min.

UNIT REFERENCES

Publications

- Gillespie, James R. *Modern Livestock & Poultry Production* (4th ed.). Albany, NY: Delmar Publishers Inc., 1992.
- Barrick, R. Kirby and Hobart L. Harmon. *Animal Production and Management.* New York: Gregg Division, McGraw-Hill Book Company, 1988.
- Pierce, Greg. *Agricultural Livestock Skills.* Stillwater, OK: CIMC, Oklahoma Department of Vocational and Technical Education, 1979.
- Thedford, Thomas R. *Sheep Health Handbook: A Field Guide for Producers with Limited Veterinary Services.* Winrock International Informational Services Publication in collaboration with Agricultural Experiment Station, Division of Agriculture, University of Arkansas, 1990. Available from Winrock International, Technical and Informational Services, Route 3, Morrilton, AR 72110.
- Thedford, Thomas R. et al. *Sheep Health and Management,* OSU Extension Facts No. 3860.
- Selk, Glenn E., Larry E. Rice, and Sally L. Northcutt. *Calving Management,* Circular E-906, Cooperative Extension Service, Division of Agricultural Sciences and Natural Resources, Oklahoma State University, n.d.

Videos

- *Calving Management: Parturition.* OSU Cooperative Extension, Order No. VT324.
- *Calving Management: Dystocia.* OSU Cooperative Extension, Order No. VT323.

ANSWERS | ***BIRTH ASSISTANCE*** | **B-5**

WRITTEN TEST

OBJECTIVE 1

1.	C	6.	D	11.	D	16.	A
2.	B	7.	B	12.	C	17.	D
3.	D	8.	C	13.	A	18.	C
4.	A	9.	B	14.	B	19.	C
5.	C	10.	B	15.	B	20.	A

OBJECTIVE 2

1.	G	6.	G	11.	C	16.	G
2.	F	7.	A	12.	B	17.	F
3.	A	8.	E	13.	F	18.	F
4.	A	9.	G	14.	H	19.	E
5.	H	10.	D	15.	A	20.	H

OBJECTIVE 3

Evaluated to the satisfaction of the instructor. Answers should reflect the information from objective 3 and from class discussion.

OBJECTIVE 4

1. Non-detergent
2. To wash the vulva and surrounding area and as a lubricant
3. A very mild soap dissolved in warm water
4. To reduce friction and irritation when inserting a sleeved arm, chains, or other equipment
5. Broad-range
6. To treat the navel cord after delivery

7. To disinfect chains or other equipment before insertion

8. a. POP and oxytocin are both acceptable

   b. Immediately or 11:50 am

   c. 2 cc

   d. 12:05 pm

OBJECTIVE 5

Instruments should be listed in the order in which they were displayed.

- Obstetrical chain or rope
- Obstetrical handle
- Mechanical calf puller

OBJECTIVE 6

Discussion must include:

- Preparation
  - Thoroughly wash your hand, wrists, and arms with soap and warm water.
  - Always wear a glove or sleeve to prevent the transmission of zoonoses.
  - Use a proper antiseptic to prevent the transmission of disease or infection from you to the animal.
- Check the cervical dilation.
- Check for signs of life.
  - Pull or pinch the fetus's foot to cause movement.
  - Place your finger in its mouth to cause a sucking response.
  - Insert your finger into the rectum to cause constriction if fetus is in the breech position.

- Check presentation, position, and posture.
  - Feel and identify the parts that are in the birth canal. Be aware of a possible multiple birth and check that the body parts you identify belong to the same animal.
  - Locate both front legs and head, or both back legs if the fetus has a posterior presentation. Both legs should be in the canal and extended.
  - Check for extended or folded body parts. When possible, gently extend the leg or straighten the head, if needed.
- Check for size.
  - Feel the wrist, checking for abnormal size.
  - Feel the head size and compare it to the diameter of the pelvis.

OBJECTIVE 7

1.	A	5.	C
2.	D	6.	B
3.	C	7.	A
4.	B	8.	D

OBJECTIVE 8

Evaluated on Job Sheet 1.

OBJECTIVE 9

Evaluated on Job Sheet 2.

OBJECTIVE 10

1.	C	4.	B
2.	C	5.	A
3.	B	6.	B

OBJECTIVE 11

1. Give the sow plenty of ventilation, sponge her down with cool water, consult a vet, and inject POP.
2. Call the vet to administer a sedative and cull the sow after the pigs are weaned.

3. a. The fetus lies across the body of the uterus.

   b. Perform a digital (finger and hand) examination. If I can identify the problem and correct it, I do. If not, I call a vet.

4. A foul vaginal discharge

5. Check the sow twice daily. Look for any vaginal discharge that might indicate a problem.

6. Answer may include any two of the following, in any order:

   - small maternal pelvis or overly large fetus
   - fractures or injuries to the pelvis
   - foul vaginal discharge

7. a. uterine inertia

   b. Check for a blockage in the birth canal. If there is no blockage and more than 30 minutes elapse between pigs, give 1-3 cc (depending on size) of POP.

OBJECTIVE 12

Evaluated on Job Sheet 3.

OBJECTIVE 13

1. They have to breathe rapidly to create a good oxygen-carbon dioxide balance.

2. Newborns must nurse within several hours of birth to get the colostrum needed to protect them against disease. The colostrum contains antibodies which are transferred to the newborn.

3. 7% solution of tincture of iodine

4. - Clip the needle teeth.
   - Notch the ears.
   - Dock the tails.
   - Give the piglets a shot of iron.

5. Answer should be written with good grammar, punctuation, and spelling. Answer *may* include information from the class discussion and information based on personal experience. It *must* address all of the following:

   - The first steps are to dry and warm the lamb immediately.
   - If breathing passages are blocked, remove the mucous by placing the lamb upside down and swinging the lamb or place the lamb across the dam's back.
   - To correct acidosis, encourage rapid breathing by tickling the lamb's nostril or by rubbing the lamb's sides vigorously.
   - Try to get the lamb to nurse, take him to the teat.
   - When he can't nurse, give him colostrum.
   - Attempts to make the ewe accept the lamb – answer must include any two of the following:
     - Tie the ewe in her pen until she will let the lamb nurse.
     - Put a dog near the pen containing the ewe and lamb.
     - Rub some of the ewe's milk on her nose and on the lamb.
     - Spray a strong-smelling salve or a household deodorizer on the ewe's nose and on the lamb.
     - Blindfold the ewe.

OBJECTIVE 14

Evaluated on Job Sheet 4.

CIMC
TEST CODE SHEET

VOCATIONAL PROGRAM (BOOK TITLE) ANIMAL SCIENCE

UNIT NUMBER AND TITLE B-5 – BIRTH ASSISTANCE

TOTAL NUMBER OF TEST QUESTIONS 84

TOTAL NUMBER OF BASIC SKILL QUESTIONS 60

OBJECTIVE NUMBER	TEST QUESTION NUMBER(S)	BASIC SKILL CODE(S)
1	1-20	S
2	1-20	S
3	1	W, S, T
4	1-4, 6, 7	X
4	5, 8 a-d	S
5	1-3	X
6	1	W, S
7	1-8	X
8	Evaluated on Job Sheet 1	
9	Evaluated on Job Sheet 2	
10	1-6	S
11	1, 2, 5, 6, 7b	X
11	3 a-b, 4, 7a	S
12	Evaluated on Job Sheet 3	
13	1, 2	S
13	3, 4	X
13	5	W, S
14	Evaluated on Job Sheet 4	

BIOTECHNOLOGY: EMBRYO TRANSFER AND GENE SPLICING

B-6

Required Activities and Resources (R)

These are fully integrated components of this CIMC curriculum. They are usually packaged in or with the curriculum and are essential in meeting the learning objectives. To individualize this unit, use the LAP Sheet supplied in your resources.

- Reproducible Handouts and Transparency Masters are included in the Instructor's Resource Package. Handouts should be copied for all students. Transparency Masters should be used to make overhead transparencies for use during instruction. A small copy of each Transparency Master appears in the student's Information Sheets.

- Non-reproducible resources are included in the student's curriculum.

Optional Activities and Resources (O)

These are suggested high-interest activities to help deliver learning objectives to students or to let students achieve objectives in an applied context. Select as many as you wish to use. Some activities use extra resources for further information about unit content. You can make them available in the classroom for in-depth study or optional activities, but their use is not required for meeting CIMC unit objectives.

FOCUS ASSIGNMENTS

Prereading

R Have students read the Handout *Designer Mice, Increased Milk, Identical Herds: What is Going On Here?*

Writing

R Have the students write a short (one paragraph to one page) discussion of the handout. Have students include their opinions of how the developments may affect consumers, producers, and the agricultural and animal science fields in general

GENERAL INSTRUCTIONS

Assignment Sheets

- [R] Review the directions and any specific guidelines.
- [R] Make certain that any needed materials from the Instructor's Resource Package are available.
- [R] Have the students complete the Assignment Sheet. Evaluate each student's performance and provide reteaching and retesting as necessary. Have the students repeat the Assignment Sheet until they achieve mastery.
- [R] Complete each student's Competency Profile.
- [O] Have the students volunteer to read aloud the directions and any special guidelines.
- [O] Return the completed Assignment Sheets to the students so that they may use them for later reference if needed.

Job Sheets

- [R] Review the introduction and evaluation criteria for the Job Sheet. Remind the students that they should not fill in the blanks in the Yes/No columns.
- [R] Review and explain all general guidelines, safety cautions, and warnings.
- [R] Make sure that all tools, equipment, and supplies are available.
- [R] Demonstrate each of the procedures outlined in the Job Sheet.
- [R] Allow the students to practice the Job Sheet skills before skills testing. Coach, correct, and supervise as necessary.
- [R] Have the students complete the Job Sheet. Evaluate each student's performance and provide remediation as necessary. Have the students repeat the Job Sheet until they achieve mastery.
- [R] Complete each student's Competency Profile.
- [R] Return the completed Job Sheets to the students so that they may use them for later reference if needed.
- [O] Have the students volunteer to read aloud the job guidelines, cautions, and warnings.

LAP Sheets

The LAP Sheets are an optional component that can be used to individualize instruction. The following instructions should be followed only if you are using the LAP Sheets.

- [R] Explain the specific procedures to be followed to the students before they begin using the LAP Sheet. Be sure that each student understands the procedures for using the LAP Sheet.
- [R] If you want the student to complete any of the assignments on the LAP Sheet that are labeled optional, assign these to the student. Be sure to provide any needed resources.

OBJECTIVE 1

Choose the word or phrase to complete statements about genetic engineering.

- [R] Discuss genetic engineering. Ask students for their perception of genetic engineering.
- [O] Obtain the pamphlets *Biotechnology at Work: Animals, People, and Biotechnology* and *Biotechnology at Work: Glossary of Terms* and make them available for students to read.
- [O] Show the video *Connections: Animals, People and Biotechnology.*
- [O] Discuss the history of biotechnology.
- [O] Have the students write a short paper on the history of biotechnology.

OBJECTIVE 2

Discuss moral and ethical issues associated with genetic engineering.

- [R] Discuss the moral and ethical issues of genetic engineering.
- [O] Ask students to find current magazine or newspaper articles dealing with moral and ethical issues regarding genetic engineering. Have students report their findings to the class.
- [O] Discuss the legal issues associated with genetic engineering. Obtain the publications *Answers to Commonly Asked Questions About Biotechnology Regulation* and *Year-End Survey of State Government Legislation on Biotechnology.*

- O Discuss somatic cell gene therapy. In somatic cell gene therapy only one gene would be transferred and targeted to operate in a specific tissue. This would not alter the genetic make-up of future generations. Somatic cell gene therapy has the potential to benefit people who suffer from certain diseases.

OBJECTIVE 3

Discuss embryo transfer.

- O Discuss embryo transfer and why a breeder might use embryo transfer.

OBJECTIVE 4

Describe the transfer process.

- O Obtain the OSU Fact Sheet No. 3158 *Embryo Transfer in Cattle* and make it available for students to read.
- O Invite an embryo transfer technician to speak to the class about embryo transfer.

OBJECTIVE 5

Discuss gene mapping and gene splicing.

- O Discuss gene mapping and gene splicing.

OBJECTIVE 6

Select situations in which gene splicing can be used.

- O Discuss situations in which gene splicing can be used.
- O Ask students to research specific examples of gene splicing and report their findings to the class.

OBJECTIVE 7

Discuss cloning technology.

- O Discuss cloning technology.

OBJECTIVE 8

Choose the word or phrase to complete statements about computer applications in animal science.

- R Discuss computer applications in animal science.
- O Bring examples of or discuss specific software programs for use in animal science.

- O Have students write a short paper on the importance of computers in the field of animal science.

OBJECTIVE 9

Write opinion statements on concerns in animal genetic engineering. (Assignment Sheet 1)

- R See the general instructions for all Assignment Sheets.
- O Have a classroom debate on an issue concerning genetic engineering. For example: Do consumers have a right to know if the milk they are purchasing involves the use of bovine somatotropin?

OBJECTIVE 10

Give a presentation on a recent development in genetic engineering or other new technology. (Assignment Sheet 2)

- R See the general instructions for all Assignment Sheets.
- R Give students specific requirements for the Assignment Sheet. Some examples for specific requirements are shown below:
  - Begin with a 30 second introduction, followed by a 2-4 minute body of the speech, and then a 30 second closing.
  - Include at least two references on the written summary.

EVALUATION

Pretest

- Use the unit Written Test for *both* the pretest and posttest. Give the students the pretest before they begin the unit.
- You may wish to use the CIMC publication *Measuring Learning and Competency Gains: The Pretest/Posttest Approach* for instructions and suggestions on giving pretests and using the results. Information for ordering this material is included in the optional resources section.
- Use pretest results to guide individual students in progressing through the unit, doing enrichment work, or moving to the next unit.

Focus Assignment

- Use an informal evaluation of the focus assignments as a diagnostic tool for determining if any students need extra help in reading comprehension or writing skills. Refer these students to their English instructor, Learning Resource Center, or Educational Enhancement Center.

Assignment Sheet

- Evaluate students on Assignment Sheet activities. Students must repeat an Assignment Sheet until they have mastered the activity.
- Complete each student's Competency Profile.

Skill Test

- Explain to the students that they will be asked to demonstrate the procedures on the Job Sheets as a skills test.
- Describe the rating scale used on the skills test.
- Reteach and retest as necessary.
- Complete each student's Competency Profile.

Posttest

- After they have completed the unit, give students the Written Test again.
- Explain to the students that they will be asked to demonstrate on the Written Test actions listed in the specific objectives.
- You may wish to use the CIMC publication *Measuring Learning and Competency Gains: The Pretest/Posttest Approach* for instructions and suggestions on giving posttests and using the results. Information for ordering this material is included in the optional resources section.
- Reteach and retest as necessary to meet individual student needs and state standards for student learning and competency gains.
- Complete the appropriate sections of the Competency Profiles.

- Review individual and group performance to evaluate teaching effectiveness. Adjust scope, sequence, or instructional methods for additional lessons as required.

REQUIRED RESOURCES

The items marked with an asterisk are included in the Instructor's Resource Package.

Publications

- *Designer Mice, Increased Milk, Identical Herds: What is Going On Here?* *

OPTIONAL RESOURCES

Publications

- *Answers to Commonly Asked Questions About Biotechnology Regulation.* Contact: Biotechnology Industry Organization, 1625 K Street, N.W. Suite 1100, Washington, DC 20006, phone (202) 857-0244.

- *Biotechnology at Work: Animals, People and Biotechnology.* Pamphlet. Contact: Biotechnology Industry Organization, 1625 K Street, N.W. Suite 1100, Washington, DC 20006, phone (202) 857-0244.

- *Biotechnology at Work: Glossary of Terms.* Pamphlet. Contact: Biotechnology Industry Organization, 1625 K Street, N.W. Suite 1100, Washington, DC 20006, phone (202) 857-0244.

- Bud, Robert. *The Uses of Life: A History of Biotechnology.* New York: The Cambridge University Press, 1993.

- *Embryo Transfer in Cattle.* OSU Extension Facts No. 3158. Stillwater, OK: Oklahoma State University Cooperative Extension Service, 1991.

  ☞ **NOTE:** For information on obtaining this fact sheet contact your local Oklahoma County Extension office. Out-of-state teachers should contact Central Mailing Services, Oklahoma State University, Stillwater, OK 74078-0550.

- Hallberg, Milton C. (ed.): *Bovine Somatotropin & Emerging Issues: An Assessment.* Boulder, CO: Westview Press, 1992. For ordering information contact: Westview Press, 5500 Central Avenue, Boulder, CO 80301-2847.

- *Measuring Learning and Competency Gains: The Pretest/Posttest Approach.* Stillwater, OK: CIMC, Oklahoma Department of Vocational and Technical Education, 1992. For ordering information call 800-522-5810.

- Wheale, Peter and Ruth McNally (eds.). *The Bio-Revolution: Cornucopia or Pandora's Box.* Winchester, MA: Pluto Press, 1990.

- *Year-End Survey of State Government Legislation on Biotechnology.* Contact: Biotechnology Industry Organization, 1625 K Street, N.W. Suite 1100, Washington, DC 20006, phone (202) 857-0244.

Videos

- *Connections: Animals, People and Biotechnology.* VHS or 3/4" format, 19 minutes. Contact: Biotechnology Industry Organization, 1625 K Street, N.W. Suite 1100, Washington, DC 20006, phone (202) 857-0244.

UNIT REFERENCES

Publications

- *Answers to Commonly Asked Questions About Biotechnology Regulation.* Washington, DC: Biotechnology Industry Organization.

- *Biotechnology at Work: Animals, People and Biotechnology.* Washington, DC: Biotechnology Industry Organization.

- *Biotechnology at Work: Glossary of Terms.* Washington, DC: Biotechnology Industry Organization.

- *Biotechnology in Agriculture.* Stillwater, OK: Mid-America Vocational Curriculum Consortium, Inc., 1992.

- Bud, Robert. *The Uses of Life: A History of Biotechnology.* New York: The Cambridge University Press, 1993.

- Burton, DeVere L. *Agriscience & Technology.* Albany, NY: Delmar Publishers, 1992.

- *Embryo Transfer in Cattle.* OSU Extension Facts No. 3158. Stillwater, OK: Oklahoma State University Cooperative Extension Service, 1991.

- Ensminger, M.E. *Animal Science Digest.* Danville, IL: Interstate Publishers, Inc., 1991.
- Hallberg, Milton C. (ed.). *Bovine Somatotropin & Emerging Issues: An Assessment.* Boulder, CO: Westview Press, 1992. For ordering information contact: Westview Press, 5500 Central Avenue, Boulder, CO 80301-2847.
- Kieffer, George H. *Biotechnology, Genetic Engineering and Society.* Reston, VA: National Association of Biology Teachers.
- Olson, Steve. *Biotechnology: An Industry Comes of Age.* Washington, DC: National Academy Press, 1986.
- *Putting Biotechnology to Work.* Washington, DC: National Academy of Sciences, 1992.
- *The Stockman's Handbook, (7th ed.).* Danville, IL: Interstate Publishers, Inc., 1992.
- Wheale, Peter and Ruth McNally (eds.). *The Bio-Revolution: Cornucopia or Pandora's Box.* Winchester, MA: Pluto Press, 1990.
- *Year-End Survey of State Government Legislation on Biotechnology.* Contact: Biotechnology Industry Organization, 1625 K Street, N.W. Suite 1100, Washington, DC 20006, phone (202) 857-0244.

ASSIGNMENT SHEETS

OBJECTIVE 9

Assignment Sheet 1

Student answers will vary. Students should write a paper on an issue in animal genetic engineering, stating their opinion. Papers should contain correct grammar, spelling, and punctuation.

OBJECTIVE 10

Assignment Sheet 2

Student answers will vary. Students should turn in a paper on a recent development in genetic engineering or other new technology and give a short oral presentation. Papers should contain correct grammar, spelling, and punctuation. Students should use good speaking techniques. Instructors may wish to evaluate this assignment sheet on additional criteria, such as the use of visual aids in the presentation.

WRITTEN TEST

OBJECTIVE 1

1. B
2. C
3. A
4. B
5. D

OBJECTIVE 2

1. Animals and humans benefit from genetic engineering.
2. Answer should include any four of the following:
   - release of organisms that could harm the environment
   - development of resistant organisms that become difficult to control in the environment

- loss of large genetic base (pool) by removing genes through genetic alteration
- genetic alteration that may cause deformities or death
- environmental impact of genetic engineering
- consumer safety concerns

3. Answer should include any five of the following:
   - Is genetic engineering a legitimate science, or are we "playing God?"
   - Will genetic engineering help relieve hunger and poverty, or will it help only the rich?
   - Is this technology useful for countries that do not raise enough food to feed themselves?
   - Will genetic engineering cause more environmental problems, or will it help relieve them?
   - Will the focus of genetic engineering research be toward commercial profitability or for improvement of animal and human welfare? Can it be both?
   - Will genetic engineering be controlled by large entities or through public representation?
   - Is regulation sufficient to prevent disastrous problems from arising?
   - Will genetic engineering narrow genetic pools and reduce genetic diversity?
   - Should we adopt high production technologies in the face of surplus commodities?
   - Is recombining genes to develop a "super" animal legitimate?
   - Is somatic cell (not passed on to the next generation) gene manipulation acceptable for animals?
   - Is gamete cell gene manipulation acceptable for animals?

OBJECTIVE 3

1. Answer should include the following:

   - Produce a greater number of offspring from desirable cows
   - More rapid genetic improvement in a herd
   - Prove the productivity of dams and sires sooner due to the greater number of offspring over a shorter time span
   - Prolonging the productive life of a female that for reasons such as injury cannot carry offspring full term.
   - The ability to import or export desirable genetic traits with embryos in cases where importing or exporting is not practical.

2. Answer should include the following:

   - One-step freezing process – a method of freezing and thawing embryos in a straw container; this process allows recipient cows to be bred in a procedure similar to artificial insemination
   - Embryo splitting – embryos are split to produce two or more identical calves from one embryo
   - Embryo sexing – embryos of known sex are implanted into recipient cows

OBJECTIVE 4

Answers should include key points from the following steps:

1. Selection of the donor cow.

   - The donor cow is selected for a variety of reasons including the potential dollar value of her calves.
   - The donor cow should have a normal reproductive tract and have no conformational or detectable genetic defects.

2. Superovulation of the donor cow.

   - The donor cow is induced to produce multiple eggs during a single estrus. This is usually accomplished by giving hormone injections of FSH (follicle stimulating hormone) and prostaglandin.

3. Insemination of the donor cow.

   - High quality semen with a large percentage of normal, motile cells is important. Donor cows may be inseminated more than once to increase the chances of fertilization.

4. Flushing of the embryos

   - The embryos are collected non-surgically by inserting a synthetic rubber catheter through the cervix of the donor cow and flushing a special medium into and out of the uterus to collect the embryos seven or eight days after estrus.

   - This process is relatively simple and can be accomplished in approximately 30 minutes without harm to the cow.

5. Evaluation of the embryos

   - Embryos are evaluated for their potential likelihood of success if transplanted to a recipient female.

6. Selection and preparation of the recipient cow

   - Recipient cows must be carefully selected. Recipient prospects should be in good health, exhibit calving ease, and have good milking and mothering abilities.

   - Estrus synchronization between the donor cow and recipient cow must be done.

7. Transfer of the embryo

   - Embryos are transferred into recipient cows.

   - Embryos may be transferred immediately upon recovery and evaluation, or they may be stored frozen in liquid nitrogen and transferred at a later date.

OBJECTIVE 5

1. The exact location of a gene on a chromosome.
2. Restriction enzyme
3. Answer should include the following points:
   - Use the same restriction enzymes to open the plasmid ring.
   - Insert the DNA pieces excised.
   - The new gene can attach to the open ends of the plasmid.
   - Ligase may be needed to close the plasmid ring.
4. The desired trait
5. Cultivate the transformed organisms so a new product or process can be used.

OBJECTIVE 6

1, 2, 4, 6, 8

OBJECTIVE 7

1. Answer should include points from the following:
   - Cloning plants can be accomplished by stimulating cell division of a single plant cell to produce a complete plant.
     - The cells must be treated and then are callus.
     - By using the procedure of tissue culture, a new plant is eventually generated.
2. Manipulation of the embryos.
3. Embryo splitting

OBJECTIVE 8

1. C
2. A
3. D
4. B
5. C

OBJECTIVE 9

Evaluated on Assignment Sheet 1.

OBJECTIVE 10

Evaluated on Assignment Sheet 2.

CIMC
TEST CODE SHEET

VOCATIONAL PROGRAM (BOOK TITLE) ANIMAL SCIENCE

UNIT NUMBER AND TITLE B-6 – BIOTECHNOLOGY: EMBRYO TRANSFER AND GENE SPLICING

TOTAL NUMBER OF TEST QUESTIONS 38

TOTAL NUMBER OF BASIC SKILL QUESTIONS 38

OBJECTIVE NUMBER	TEST QUESTION NUMBER(S)	BASIC SKILL CODE(S)
1	1-5	S
2	1-3	W, S
3	1-2	W, S
4	1-7	W, S
5	1-5	S
6	1-8	S
7	1-3	S
8	1-5	S
9	Evaluated on Assignment Sheet 1	
10	Evaluated on Assignment Sheet 2	

Required Activities and Resources (R)

These are fully integrated components of this CIMC curriculum. They are usually packaged in or with the curriculum and are essential in meeting the learning objectives. To individualize this unit, use the LAP Sheet supplied in your resources.

- Reproducible Handouts and Transparency Masters are included in the Instructor's Resource Package. Handouts should be copied for all students. Transparency Masters should be used to make overhead transparencies for use during instruction. A small copy of each Transparency Master appears in the student's Information Sheets.
- Non-reproducible resources are included in the student's curriculum.

Optional Activities and Resources (O)

These are suggested high-interest activities to help deliver learning objectives to students or to let students achieve objectives in an applied context. Select as many as you wish to use. Some activities use extra resources for further information about unit content. You can make them available in the classroom for in-depth study or optional activities, but their use is not required for meeting CIMC unit objectives.

FOCUS ASSIGNMENTS

Prereading

R Have students read Handout 1, "Animal Welfare, Animal Rights, and You."

Writing

R Have students write a short essay (a paragraph to a page) on ways in which this controversy might affect them.

GENERAL INSTRUCTIONS

Assignment Sheets

- [R] Review the directions and any specific guidelines.
- [R] Make certain that any needed materials from the Instructor's Resource Package are available.
- [R] Have the students complete the Assignment Sheet. Evaluate each student's performance and provide reteaching and retesting as necessary. Have the students repeat the Assignment Sheet until they achieve mastery.
- [R] Complete each student's Competency Profile.
- [O] Have the students volunteer to read aloud the directions and any special guidelines.
- [O] Return the completed Assignment Sheets to the students so that they may use them for later reference if needed.

Job Sheets

- [R] Review the introduction and evaluation criteria for the Job Sheet. Remind the students that they should not fill in the blanks in the Yes/No columns.
- [R] Review and explain all general guidelines, safety cautions, and warnings.
- [R] Make sure that all tools, equipment, and supplies are available.
- [R] Demonstrate each of the procedures outlined in the Job Sheet.
- [R] Allow the students to practice the Job Sheet skills before skills testing. Coach, correct, and supervise as necessary.
- [R] Have the students complete the Job Sheet. Evaluate each student's performance and provide remediation as necessary. Have the students repeat the Job Sheet until they achieve mastery.
- [R] Complete each student's Competency Profile.
- [R] Return the completed Job Sheets to the students so that they may use them for later reference if needed.
- [O] Have the students volunteer to read aloud the job guidelines, cautions, and warnings.

LAP Sheets

The LAP Sheets are an optional component that can be used to individualize instruction. The following instructions should be followed only if you are using the LAP Sheets.

R Explain the specific procedures to be followed to the students before they begin using the LAP Sheet. Be sure that each student understands the procedures for using the LAP Sheet.

R If you want the student to complete any of the assignments on the LAP Sheet that are labeled optional, assign these to the student. Be sure to provide any needed resources.

☑ **NOTE:**

This unit is very long and the test runs over thirty pages. You might want to teach the unit in sections and test over each section, rather than require students to complete the test in one sitting. The test is divided according to the following suggested natural breaks:

- Section 1 – objectives 1-6, general health care practices
- Section 2 – objectives 7-12, health plans and disinfectants
- Section 3 – objectives 13-17, dealing with illness and injury
- Section 4 – objectives 18-23, handling and restraints

OBJECTIVE 1

Discuss animal health care.

R Review and discuss objectives 4, 5, 6, 8, 10, and 11 in Unit A-1, "Safety."

O Invite a veterinarian and/or a livestock owner/manager to discuss the health care plan and how vets and managers work together.

O Share personal examples of successful and unsuccessful health care practices.

O Discuss animal welfare and animal rights.

OBJECTIVE 2

List signs of a healthy animal.

R Discuss signs of healthy and unhealthy animals from this objective and objective 3 and compare them.

- O Invite a veterinarian or herd manager to discuss signs of a healthy animal.
- O Show slides or videos of healthy animals.

OBJECTIVE 3 **List signs of an unhealthy animal.**

- O Invite a veterinarian or herd manager to discuss signs of an unhealthy animal.
- O Compare signs of an unhealthy animal to human health and behavior.
- O Show slides or videos of unhealthy animals.

OBJECTIVE 4 **Match livestock to their normal ranges of temperature, pulse rate, and breathing rate.**

- O Compare normal rates and ranges to those of humans and other animals.
- O Stress the importance of knowing the norms and recognizing any variation from them.
- O Relate this knowledge to good record keeping.

OBJECTIVE 5 **Take an animal's temperature. (Job Sheet 1)**

- R See the general instructions for all Job Sheets.

OBJECTIVE 6 **Check an animal for signs of good health. (Job Sheet 2)**

- R See the general instructions for all Job Sheets.

OBJECTIVE 7 **Discuss good management practices for maintaining animal health.**

- R Discuss why each of the items listed is important for maintaining animal health.
- O Arrange a field trip so students can visit facilities or locations where they can observe the herd or flock management practices used. A variety of facilities or locations should be visited, including pastures, small structures, and large commercial structures.
- O Have students research how management practices protect human health, water systems, or other areas of concern.

- O Assign one of the OSU Extension publications listed in the Optional Resources to each student and have them read the publication, then make an oral report to the class.
- O Provide examples of facility designs.
- O Discuss the high rate of TGE spread during spring stock shows because animals from different herds are kept in the same space and because sanitation can't be as carefully controlled as required. Any pig that steps in the manure or urine of an infected pig is likely to get the disease and carry it back to the herd.

OBJECTIVE 8 **Discuss factors to consider when developing a health plan.**

- R Discuss each of the items listed, detailing how it relates to the health plan, why it is important, and how it relates to other aspects of herd management.
- O Show students examples of written health plans and records.

OBJECTIVE 9 **Adapt an animal health care plan to your individual needs. (Assignment Sheet 1)**

- R See the general instructions for all Assignment Sheets.

☞ **NOTE:** If you don't have enough fact sheets for your class, request additional copies from your Cooperative Extension office.

OBJECTIVE 10 **Select true statements about ventilation.**

- O Allow students to experience examples of good and poor ventilation and report on their physical and psychological reactions.
- O Discuss the relationship between humidity and air movement.
- O Let students examine the ventilation system in their ag facility, in a greenhouse, and in a livestock barn or other structure.

OBJECTIVE 11 **Choose the word or phrase to complete statements about the use of disinfectants.**

- R Teach objectives 11 and 12 together.
- O Stress the importance of knowing how to learn about disinfectants, which disinfectant to use, and how to use it correctly.

- O Have students wash down several clearly developed forms of fungus with several types of disinfectants and observe the results.

- O Perform an experiment in which three students place a bacterial substance that will grow if nurtured (i.e. their spit) in three petri dishes each and let one grow without interference, and spray different types of disinfectant on the other two. You will have three control samples and six experimental samples.

OBJECTIVE 12 **Match disinfectants to their uses and descriptions.**

- R Provide a resource that gives information on types of disinfectants, their application rates, and their uses, such as *Farmer's Digest, The Stockman's Handbook* or *Pork Industry Handbook* publication PIH-180, "Selection and Use of Disinfectants in Disease Prevention."

- O Show several common types of disinfectants and discuss their use, strengths, and limitations. Let students see, smell, and feel those that aren't caustic or toxic.

- O Stress the caustic and toxic characteristics of some disinfectants.

- O Show *Fumigation Safety* or another video on application.

OBJECTIVE 13 **Choose the word or phrase to complete statements about caring for sick animals.**

- O Provide information on how students can get first-aid training in your area.

- O Discuss the importance of close observation and good record keeping.

OBJECTIVE 14 **Collect fresh urine and fecal samples. (Job Sheet 3)**

- R See the general instructions for all Job Sheets.

OBJECTIVE 15 **Discuss considerations for treating wounds.**

- O Reproduce and distribute the Handout 2 on types of injuries, if desired.

- O Provide additional examples of the examine-evaluate process.

- O Discuss the need to improvise in some circumstances.

- O Invite a veterinarian to discuss what the students can learn to do and when to call the vet.

O Arrange for students to visit a veterinary facility where they can observe animals being treated for injuries.

OBJECTIVE 16 **Treat wounds. (Job Sheet 4)**

R See the general instructions for all Job Sheets.

R If you don't have animals available to treat, construct a simulated injury and simulated blood flow.

OBJECTIVE 17 **Discuss major shelter requirements of livestock.**

R Discuss each of the requirements listed, noting how they relate to one another, to animal health, and to finances.

O Have students compare differences in climate and how they affect shelter requirements.

O Have students research ways herd management has affected space requirements, such as breeding polled cattle or producing free-range chickens.

O Show the pertinent sections of *Management Practices for Beef Cattle I, Sheep Management Practices I, Swine Management Practices I, Beef Cattle Handling Facilities*, or other video on facilities.

OBJECTIVE 18 **Select handling characteristics for cattle, swine, and sheep.**

R Discuss handling characteristics, noting similarities and differences for different species.

OBJECTIVE 19 **Identify restraints for cattle, sheep, swine, and poultry.**

O Stress to students that learning restraints and being confident in their use is critical to effective management. They will be using these restraints for many job sheets in this curriculum.

O Review the uses and purposes of each of the restraints listed.

O Compare the restraints used for similar purposes but designed for different animals.

O Demonstrate the use of restraints.

O Show the pertinent sections of *Management Practices for Beef Cattle I, Sheep Management Practices I, Swine Management Practices I, Beef Cattle Handling Facilities*, or other video on handling and restraints.

OBJECTIVE 20 **Select true statements about chemical restraints.**

R Refer students to Unit C4, "Vaccination and Drugs."

O Discuss and demonstrate how chemical restraints are used.

OBJECTIVE 21 **Use flank casting and castration restraint on cattle. (Job Sheet 5)**

R See the general instructions for all Job Sheets.

OBJECTIVE 22 **Use vaccination or castration restraint on small pigs. (Job Sheet 6)**

R See the general instructions for all Job Sheets.

OBJECTIVE 23 **Use castration and docking restraint on small sheep. (Job Sheet 7)**

R See the general instructions for all Job Sheets.

EVALUATION

Pretest

- Use the unit Written Test for *both* the pretest and posttest. Give the students the pretest before they begin the unit.
- You may wish to use the CIMC publication *Measuring Learning and Competency Gains: The Pretest/Posttest Approach* for instructions and suggestions on giving pretests and using the results. Information for ordering this material is included in the optional resources section.
- Use pretest results to guide individual students in progressing through the unit, doing enrichment work, or moving to the next unit.

Focus Assignment

- Use an informal evaluation of the focus assignments as a diagnostic tool for determining if any students need extra help in reading comprehension or writing skills. Refer these students to their English instructor, Learning Resource Center, or Educational Enhancement Center.

Assignment Sheet

- Evaluate students on Assignment Sheet activities. Students must repeat an Assignment Sheet until they have mastered the activity.
- Complete each student's Competency Profile.

Skill Test

- Explain to the students that they will be asked to demonstrate the procedures on the Job Sheets as a skills test.
- Describe the rating scale used on the skills test.
- Reteach and retest as necessary.
- Complete each student's Competency Profile.

Posttest

- After they have completed the unit, give students the Written Test again.
- Explain to the students that they will be asked to demonstrate on the Written Test actions listed in the specific objectives.
- You may wish to use the CIMC publication *Measuring Learning and Competency Gains: The Pretest/Posttest Approach* for instructions and suggestions on giving posttests and using the results. Information for ordering this material is included in the optional resources section.
- Reteach and retest as necessary to meet individual student needs and state standards for student learning and competency gains.
- Complete the appropriate sections of the Competency Profiles.
- Review individual and group performance to evaluate teaching effectiveness. Adjust scope, sequence, or instructional methods for additional lessons as required.

REQUIRED RESOURCES

The items marked with an asterisk are included in the Instructor's Resource Package.

Publications

- OSU Extension Facts, Oklahoma State University Cooperative Extension Service, Division of Agricultural Sciences and Natural Resources:
  - F-3861, *A Planning Calendar for Sheep Herd Health and Management*
  - F-3260, *A Planning Calendar for Beef Cattle Herd Health*

OPTIONAL RESOURCES

Publications

- *Animal Agriculture: Myths and Facts*. Animal Industry Foundation, 1988. Arlington, VA: Animal Industry Foundation, 1988.
- Books with illustrations of various housing plans for cattle, sheep, swine, and poultry:
  - Barrick, R. Kirby and Hobart L. Harmon. *Animal Production and Management.*
  - Ensminger, M.E. *The Stockman's Handbook.*
  - Gillespie, James R. *Modern Livestock & Poultry Production.*
- *Measuring Learning and Competency Gains: The Pretest/Posttest Approach*. Stillwater, OK: CIMC, Oklahoma Department of Vocational and Technical Education, 1992. For ordering information call 800-522-5810.
- Publications of Oklahoma State University Cooperative Extension Service, Division of Agricultural Sciences and Natural Resources (F=Fact Sheet, E=Circular, PIH=Pork Industry Handbook):
  - F-3261, *Beef Cow Herd Calendar*
  - F-9105, *A Guide to Swine Health*
  - F-3860, *Sheep Health and Management*
  - F-3856, *Before Going into the Sheep Business*
  - F-3999, *Livestock Disease – Cause and Control*

- F-8205, *Hot Weather Management in the Poultry House*
- F-8207, *Rodent Control in the Poultry House*
- F-8208, *Dead Bird Disposal*
- F-8209, *Wild Bird Control in the Poultry House*
- F-9103, *Preparations and Equipment Necessary for Receiving and Processing Stocker Cattle*
- F-9121, *Flea Control*
- E-913, *Oklahoma Beef Cattle Manual*
- PIH-79, *Environmental Sanitation and Management in Disease Prevention*
- PIH-180, *Selection and Use of Disinfectants in Disease Prevention*

Videos

- Animal welfare-animal rights
  - *The Animal Film.* The Cinema Guild, 1697 Broadway, New York, NY 10019. Pro-animal rights. (VHS, 136 min, 1981)
  - *Animal Agriculture: Myths and Facts.* Animal Industry Foundation, P.O. Box 5922, Arlington, VA 22209-0522. (VHS, 18 min)
  - *Cattlemen Care about Animal Welfare.* Communcation Dept., National Cattlemen's Association, Box 3469, Englewood, CO 80155. (VHS, 18 min, 1991)
- Video productions available from OSU Cooperative Extension Service:
  - VT63A, *Beef Cattle Handling Facilities*
  - VT395, *Fumigation Safety*

- Video productions containing sections addressed in this unit. Available from Creative Educational Video, Lubbock, Texas, 1987. For ordering information call 800-922-9965:
  - *Management Practices for Beef Cattle I*: handling and restraint techniques, facilities identification
  - *Sheep Management Practices I*: handling and restraint, housing and facilities
  - *Swine Management Practices I*: site selection, housing, facilities

UNIT REFERENCES

Publications

- *Advanced Animal Science*. AS300A Series, Michigan Agriscience and Natural Resources Advanced/Specialized Curriculum. Michigan: State Administrative Board, 1991.
- Barrick, R. Kirby and Hobart L. Harmon. *Animal Production and Management*. New York: Gregg Division, McGraw-Hill Book Company, 1988.
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- Patton, Bob. *Vocational Agriculture II*. Stillwater, OK: CIMC, Oklahoma Department of Vocational and Technical Education, 1978.
- Pierce, Greg. *Agricultural Livestock Skills*. Stillwater, OK: CIMC Oklahoma Department of Vocational and Technical Education, 1979.
- Rice, L. E., and T. R. Thedford. *A Planning Calendar for Beef Cattle Herd Health*. OSU Extension Facts No. F-3260. Stillwater, OK: Cooperative Extension Service, Oklahoma State University, Department of Agriculture, n.d.
- Stamm, G. W. *Veterinary Guide for Farmers*. New York: The Hearst Corporation, 1975.
- *Stedman's Medical Dictionary*, (25th ed.). Baltimore: Williams and Wilkins, 1990.
- Thedford, Thomas R. *Sheep Health Handbook: A Field Guide for Producers with Limited Veterinary Services*. Winrock International Informational Services Publication in collaboration with Agricultural Experiment Station, Division of Agriculture, University of Arkansas, 1990.
- Thedford, Thomas. R., Bill Crutcher, and Joe Hughes. *A Planning Calendar for Sheep Herd Health and Management*. OSU Extension Facts No. F-3861. Stillwater, OK: Cooperative Extension Service, Oklahoma State University, Department of Agriculture, n.d.

ANSWERS

ANIMAL HEALTH CARE C-1

ASSIGNMENT SHEET

Answers will vary according the health plan used, the school calendar, and the ag calendar. Be sure that all aspects of the health program are included in the calendar.

WRITTEN TEST

OBJECTIVE 1

1. "Hidden losses" occur through increased labor and costs accompanied by lowered profits from animals that have low production values because of poor health (slow growth, slow maturity, low reproductive abilities, poor feed efficiency, carcass condemnations and reduced meat quality).

2. Answer must include any five of the following, in any order:

   - heredity
   - nutrition
   - parasites
   - injuries
   - environmental stress
   - human behavior, human decisions, and human error

3. Answers will vary, but must include the idea that human factors such as mistreatment, negligence, poor judgement, and lack of knowledge and experience, are responsible for livestock disease and death.

4. Answers must include any five of the following, in any order:

   - Protect animals from the elements (cold, heat, wind, sun).
   - Protect animals from diseases and parasites.
   - Provide healthful living conditions: develop a sound program of general cleanliness and sanitation.
   - Provide plenty of fresh water.
   - Provide sufficient and suitable feed.
   - Treat animals with respect; do not abuse them physically or psychologically.

5. A health plan is a schedule or calendar that includes standard livestock health care practices and those that are required for your individual operation.

6. the stock manager and the veterinarian

7. Answers must include any five of the following, in any order:

   - breeding
   - pregnancy testing
   - birthing preparation and procedures
   - worming, vaccination, and other preventive health medications
   - performing health-maintenance and production procedures such as regular physical examinations, castration, dehorning, docking, shearing, and animal identification (branding, tagging)
   - cleaning and disinfecting schedules
   - feeding and changing feed schedules
   - marketing

8. Answers will vary, but must include the idea that accurate records enable the vet to determine the animal's health history and what has already been done that might affect the condition for which he or she has been called for consultation.

9. Answers must include all five of the following, in any order:

   - you are planning and working with a preventive health program
   - an animal is seriously injured
   - an animal is having reproductive problems, such as failure to conceive, miscarriage, or difficult birth
   - an animal dies and you don't know why; the vet should determine the cause of death
   - when animals have symptoms of a contagious disease

10. Early treatment can save money, save an animal's life, and make the vet's work easier.

11. Answers will vary but must include, at minimum, all of the following ideas, in any order:

    - Provide the animal's health records.
    - Observe a sick animal carefully and record symptoms in the order of occurrence.
    - Restrain the animal.
    - Follow the vet's recommendations, including administering medications and performing treatment as directed.

12. cleanliness (sanitation)

OBJECTIVE 2

Answers must include the following, in any order:

- contentment, can rest peacefully
- alertness

- aggressive appetite
- sleek hair and smooth, pliable skin
- bright eyes and moist, pink eye membranes
- normal feces and urine
- normal temperature, pulse rate, and breathing rate
- alert, normal ear set

OBJECTIVE 3

Answers must include ten of the following, in any order:

- decreased food or water consumption; failure of young animals to nurse
- listlessness
- dry nose
- abnormal feces or urine, or difficulty in elimination
- abnormal discharge from the nose, mouth, or eyes
- unusual posture
- persistent rubbing or licking
- dull hair and dry, scruffy skin
- inflammation or swelling under or on the skin
- loss of hair or feathers
- pale, red, or purple mucous membranes lining the eyes or gums
- unusual movements or reluctance to move
- abnormal temperature, breathing, or pulse rate
- altered social behavior

- sudden drop in production
- ruminants not chewing their cuds

OBJECTIVE 4

temperature

1. B
2. C
3. E
4. H

pulse

1. B
2. D
3. C
4. G

breathing rate

1. C
2. D
3. A
4. E

OBJECTIVE 5

Evaluated on Job Sheet 1.

OBJECTIVE 6

Evaluated on Job Sheet 2.

OBJECTIVE 7

1. Answers must include the following:
   - Purchase animals from reputable producers.
   - Ask the producer for appropriate health papers and ask questions that might uncover health problems.
   - Isolate newly purchased animals in a separate pasture, lot, or barn for a minimum of three to four weeks before exposing them to your other livestock.
   - Control outside traffic, including vehicles and people. Keep shipping and receiving areas separate from the normal environments of your livestock.

2. Answers must include the following:

   - Maintain a comprehensive sanitation program.
     - Use disinfectants.
     - Keep all areas clean.
     - Provide good housing that has sufficient ventilation and drainage and can be thoroughly cleaned.
     - Vacate barns and housing for at least one month a year for thorough cleaning, disinfecting, and drying.
     - Clean and sanitize housing after one animal is removed and before another animal is placed in the same area.
     - Remove manure from the areas where livestock live and feed.
   - Provide coveralls and boots for outsiders entering your buildings, lots, and pastures. Have visitors disinfect their shoes before entering livestock buildings.
   - Control birds, rodents, and stray animals.
   - Establish a method of identifying animals that are sick or are being treated. Isolate these animals from the rest of the herd.

3. Answers must include the following:

   - Control outside traffic, including vehicles and people. Keep shipping and receiving areas separate from the normal environments of your livestock.
   - Provide coveralls and boots for outsiders entering your buildings, lots, and pastures. Have visitors disinfectant their shoes before entering livestock buildings.
   - Control birds, rodents, and stray animals.
   - Maintain adequate fencing.
   - Establish a method of identifying animals that are sick or are being treated.

4. Answers must include the following, in any order:

   - Dispose of dead animals promptly and properly. Bury or burn them, or hire a dead-animal disposal service.

   - Establish a method of identifying animals that are sick or are being treated. Isolate these animals from the rest of the herd.

5. to control disease and parasites

6. Answers must include the following, in any order:

   - Maintain adequate fencing. Use a double fence between your herd and a poorly managed neighboring herd.

   - Plan the location of your buildings and lots to protect your operation from your neighbor's livestock drainage during wet periods.

OBJECTIVE 8

1. Keep a complete set of records on each animal. Keep records on animal numbers and birthdates; immunizations; breeding and reproductive information such as heats, breedings, births, sex, birthweights, and weaning weight of offspring; the history of the animal's illnesses and treatments.

2. A closed herd helps eliminate problems associated with introduced reproductive diseases and failures.

3. Obtain semen-tested virgin sires from known healthy herds.

4. - Plan a preventive medicine schedule for all diseases and parasites for which protection is needed. The schedule should include dates for initial medication and boosters and their doses. Immunizations and surgical procedures of offspring should also be incorporated into the program.

   - Conduct yearly physical examinations of brood stock. Examine eyes for diseases or growths, teeth for wear or breakage, feet for disease or damage and possible trimming or repair. Treat for internal and external parasites. Perform reproductive tract and pregnancy examinations.

5. Institute and maintain a comprehensive sanitation program. Provide animals with clean, dry, well-ventilated housing. Use antiseptics and disinfectants; dispose of waste and dead animals properly.

OBJECTIVE 9 — **Evaluated on Assignment Sheet 1.**

OBJECTIVE 10 — 2, 3, 4, 7, 8, 10, 13, 16, 17

OBJECTIVE 11

1. B
2. A
3. C
4. C
5. B
6. C
7. D

OBJECTIVE 12

Part 1	Part 2	Part 3
1. J	1. E	1. E
2. A	2. A	2. H
3. G	3. F	3. L
4. C	4. G	4. I
5. D	5. L	5. D
6. I	6. H	6. F

OBJECTIVE 13

1. A
2. C
3. D
4. A
5. A
6. C
7. C
8. B

OBJECTIVE 14 — **Evaluated on Job Sheet 3.**

OBJECTIVE 15

1. Examine the wound. Evaluate whether to treat or slaughter.
2. Answers will vary, but must include the following steps, in order:
    - Stop the bleeding with mild pressure on the wound, such as with a compression bandage.
    - Clean the wound: Cut away the wool, then clean the wound with mild soap and water. Remove all dirt and debris from the wound area.
    - Administer a topical or injectable antibiotic.
    - Watch for signs of infection: redness, swelling, or pus.
    - Call a veterinarian if the wound becomes infected.
3. Answers will vary, but must include the following points:
    - A vein has been severed. The bull can suffer a major blood loss. The wound is so severe that MOST LIKELY it should be slaughtered right away.
    - Considerations should include:
        - Call the vet. Ask about
            - the cost of treating the injury
            - the probability of recovery
            - the time the bull will be out of service
        - With a compound fracture, the bull will be out of service for this mating season and maybe for the next season.
        - The cost of treatment and time out of service, will probably exceed the value of the bull as a breeder.

OBJECTIVE 16

Evaluated on Job Sheet 4.

OBJECTIVE 17

1. Answers must include the following:

   - Provide good ventilation to prevent disease.
   - Provide good ventilation to prevent a buildup of moisture.
   - Maintain acceptable temperatures with good ventilation and proper insulation.
   - Provide an appropriate environment for newborn animals.

2. Answers must include the following:

   - The producer should meet the needs of the livestock, but should ask "Can the livestock enterprise using the building pay for it before it is worn out?"
   - The producer should also be as flexible as possible in design, bearing in mind that the facility may have to be adapted or changed if the enterprise is changed.

3. Design your shelter space to keep labor to a minimum, allow easy cleaning and manure handling, and ease of maintaining sanitation.
4. Structures should withstand wind strains or roof snow.
5. Place them so that rain water, animal urine, and cleaning water will drain away from the building.
6. Maximize the use of natural light and provide adequate artificial light. If production cycles rely on day-length, provide a system to increase and decrease artificial day-length.
7. Design your structure for your safety and for safe animal use of alleys and doors. Minimize the risk of fire with your choice of materials and storage areas.
8. Provide adequate space for operators to work, for feed and bedding storage, for treating sick and injured animals, and for the species of animal sheltered.

OBJECTIVE 18

Cattle: 1, 2, 7, 8

Sheep: 2, 4, 8

Swine: 1, 2, 3, 4, 6, 9

OBJECTIVE 19

Part 1

1. cattle stock
2. cattle chute and headgate
3. tilting calf table
4. tilting table stock
5. rope squeeze casting
6. castration restraint
7. calf castration tie
8. flank casting
9. rope
10. trimming stand
11. panels
12. chute
13. pregnancy testing table
14. chin catch restraint
15. castration and docking restraint for small sheep
16. shearing stance
17. halter
18. flank catch
19. hog holder
20. snubbing rope
21. pig trap
22. vaccination or castration restraint for small pigs
23. vaccination or castration restraint for large pigs
24. flank catch
25. heart girth

Part 2

1. A
2. C
3. A
4. D
5. A

OBJECTIVE 20 1, 4, 5, 8, 9, 11, 12

OBJECTIVE 21 **Evaluated on Job Sheet 5.**

OBJECTIVE 22 **Evaluated on Job Sheet 6.**

OBJECTIVE 23 **Evaluated on Job Sheet 7.**

CIMC
TEST CODE SHEET

VOCATIONAL PROGRAM (BOOK TITLE) ANIMAL SCIENCE

UNIT NUMBER AND TITLE C-1 – ANIMAL HEALTH CARE

TOTAL NUMBER OF TEST QUESTIONS 186

TOTAL NUMBER OF BASIC SKILL QUESTIONS 100

OBJECTIVE NUMBER	TEST QUESTION NUMBER(S)	BASIC SKILL CODE(S)
1	1, 3, 5-8, 10, 12	X
1	2	S
1	4, 9, 11	W
2	1-8	S
3	1-10	S
4	Temperature 1-4, Pulse 1-4, Breathing Rate 1-4	S
5	Evaluated on Job Sheet 1	
6	Evaluated on Job Sheet 2	
7	1-5	W
8	1, 4, 5	W, S
8	2, 3	S
9	Evaluated on the Assignment Sheet	
10	1-20	S
11	1-4, 6, 7	S
11	5	X
12	Part 1: 1-6, Part 2: 1-6, Part 3: 1-6,	S

CIMC
TEST CODE SHEET

VOCATIONAL PROGRAM (BOOK TITLE) ANIMAL SCIENCE

UNIT NUMBER AND TITLE C-1 – ANIMAL HEALTH CARE

OBJECTIVE NUMBER	TEST QUESTION NUMBER(S)	BASIC SKILL CODE(S)
13	1-8	S
14	Evaluated on Job Sheet 3	
15	1	X
15	2, 3	W, S
16	Evaluated on Job Sheet 4	
17	1-8	W
18	Cattle 1-10, Sheep 1-8, Swine 1-10	X
19	Part 1: 1-25, Part 2: 1-5	X
20	1-12	S
21	Evaluated on Job Sheet 5	
22	Evaluated on Job Sheet 6	
23	Evaluated on Job Sheet 7	

Required Activities and Resources (R)

These are fully integrated components of this CIMC curriculum. They are usually packaged in or with the curriculum and are essential in meeting the learning objectives. To individualize this unit, use the LAP Sheet supplied in your resources.

- Reproducible Handouts and Transparency Masters are included in the Instructor's Resource Package. Handouts should be copied for all students. Transparency Masters should be used to make overhead transparencies for use during instruction. A small copy of each Transparency Master appears in the student's Information Sheets.

- Non-reproducible resources are included in the student's curriculum.

Optional Activities and Resources (O)

These are suggested high-interest activities to help deliver learning objectives to students or to let students achieve objectives in an applied context. Select as many as you wish to use. Some activities use extra resources for further information about unit content. You can make them available in the classroom for in-depth study or optional activities, but their use is not required for meeting CIMC unit objectives.

FOCUS ASSIGNMENTS

Prereading

R Have students read *A Guide for Developing a Preventive Medicine Program*, by Thomas R. Thedford, OSU Extension Facts No. 3993.

Writing

R Have students write a short essay (one paragraph to one page) about the financial burden caused by diseases and the procedures that should be followed to reduce the risk of disease.

GENERAL INSTRUCTIONS

Assignment Sheets

- [R] Review the directions and any specific guidelines.
- [R] Make certain that any needed materials from the Instructor's Resource Package are available.
- [R] Have the students complete the Assignment Sheet. Evaluate each student's performance and provide reteaching and retesting as necessary. Have the students repeat the Assignment Sheet until they achieve mastery.
- [R] Complete each student's Competency Profile.
- [O] Have the students volunteer to read aloud the directions and any special guidelines.
- [O] Return the completed Assignment Sheets to the students so that they may use them for later reference if needed.

Job Sheets

- [R] Review the introduction and evaluation criteria for the Job Sheet. Remind the students that they should not fill in the blanks in the Yes/No columns.
- [R] Review and explain all general guidelines, safety cautions, and warnings.
- [R] Make sure that all tools, equipment, and supplies are available.
- [R] Demonstrate each of the procedures outlined in the Job Sheet.
- [R] Allow the students to practice the Job Sheet skills before skills testing. Coach, correct, and supervise as necessary.
- [R] Have the students complete the Job Sheet. Evaluate each student's performance and provide remediation as necessary. Have the students repeat the Job Sheet until they achieve mastery.
- [R] Complete each student's Competency Profile.
- [R] Return the completed Job Sheets to the students so that they may use them for later reference if needed.
- [O] Have the students volunteer to read aloud the job guidelines, cautions, and warnings.

LAP Sheets

The LAP Sheets are an optional component that can be used to individualize instruction. The following instructions should be followed only if you are using the LAP Sheets.

- R Explain the specific procedures to be followed to the students before they begin using the LAP Sheet. Be sure that each student understands the procedures for using the LAP Sheet.
- R If you want the student to complete any of the assignments on the LAP Sheet that are labeled optional, assign these to the student. Be sure to provide any needed resources.

OBJECTIVE 1

Choose the word or phrase to complete statements about livestock diseases and parasites.

- O Have students share their experiences with diseases, parasites, or disease\parasite prevention.
- O Invite a vet or a stock manager to discuss prevention programs.
- O Visit a farm to have students identify signs of good health and observe measures that prevent disease.

OBJECTIVE 2

Arrange in order the life cycle stages of an internal parasite.

- R Use Transparency Master 1 to discuss the life cycle of an internal parasite.
- O Have students research the life cycle of internal parasites not covered in class.

OBJECTIVE 3

Match common internal parasites to their descriptions.

- O Have students look up photos of animals infected with internal parasites.
- O Invite a vet to discuss the internal parasites in your region.
- O Obtain and observe specimens of internal parasites.

OBJECTIVE 4

Arrange in order the life cycle stages of external parasites.

- R Use Transparency Masters 2 and 3 to discuss the life cycle of external parasites.
- O Have students research the life cycle of external parasites not covered in class.

OBJECTIVE 5 **Match common external parasites to their descriptions.**

- O Have students look up photos of animals infected with external parasites.
- O Invite a vet to discuss the common external parasites that affect the region.
- O Obtain and observe specimens of external parasites.
- O Visit a farm and observe animal behavior under the influence of external parasites.

OBJECTIVE 6 **Discuss parasite control.**

- O Visit a farm with an effective parasite control program.
- O Visit a farm with a poor parasite control program.
- O Have students prepare a parasite control program for a hypothetical farm.

OBJECTIVE 7 **Complete Assignment Sheet 1.**

- R See the general instructions for all Assignment Sheets.

OBJECTIVE 8 **Match common infectious diseases to their descriptions.**

- O Have students look up photos of animals with infectious diseases.
- O Have students share their experiences with infectious diseases in animals and humans.
- O Invite a vet to discuss the infectious diseases that affect the region.

OBJECTIVE 9 **Match common noninfectious diseases to their descriptions.**

- O Have students look up photos of animals with noninfectious diseases.
- O Have students share their experiences with noninfectious diseases in animals and humans.
- O Invite a vet to discuss the noninfectious diseases that affect the region.
- O Visit a farm or veterinary clinic and observe animals suffering from infectious and noninfectious diseases.

OBJECTIVE 10

Discuss disease prevention.

- [O] Have students share their experience with disease prevention programs.
- [O] Invite a vet to discuss disease prevention.
- [O] Visit a farm that follows a strong disease prevention program.
- [O] Visit a farm that follows a weak disease prevention program.
- [O] Have students prepare a disease prevention program for a hypothetical farm.

OBJECTIVE 11

Complete Assignment Sheet 2.

- [R] See the general instructions for all Assignment Sheets.
- [R] Assign diseases to the students, compile the completed charts, and copy and distribute the final product to all students.

EVALUATION

Pretest

- Use the unit Written Test for *both* the pretest and posttest. Give the students the pretest before they begin the unit.
- You may wish to use the CIMC publication *Measuring Learning and Competency Gains: The Pretest/Posttest Approach* for instructions and suggestions on giving pretests and using the results. Information for ordering this material is included in the optional resources section.
- Use pretest results to guide individual students in progressing through the unit, doing enrichment work, or moving to the next unit.

Focus Assignment

- Use an informal evaluation of the focus assignments as a diagnostic tool for determining if any students need extra help in reading comprehension or writing skills. Refer these students to their English instructor, Learning Resource Center, or Educational Enhancement Center.

Assignment Sheet

- Evaluate students on Assignment Sheet activities. Students must repeat an Assignment Sheet until they have mastered the activity.
- Complete each student's Competency Profile.

Skill Test

- Explain to the students that they will be asked to demonstrate the procedures on the Job Sheets as a skills test.
- Describe the rating scale used on the skills test.
- Reteach and retest as necessary.
- Complete each student's Competency Profile.

Posttest

- After they have completed the unit, give students the Written Test again.
- Explain to the students that they will be asked to demonstrate on the Written Test actions listed in the specific objectives.
- You may wish to use the CIMC publication *Measuring Learning and Competency Gains: The Pretest/Posttest Approach* for instructions and suggestions on giving posttests and using the results. Information for ordering this material is included in the optional resources section.
- Reteach and retest as necessary to meet individual student needs and state standards for student learning and competency gains.
- Complete the appropriate sections of the Competency Profiles.
- Review individual and group performance to evaluate teaching effectiveness. Adjust scope, sequence, or instructional methods for additional lessons as required.

REQUIRED RESOURCES

The items marked with an asterisk are included in the Instructor's Resource Package.

Publications

- Thedford, T.R. *A Guide for Developing a Preventive Medicine Program.* OSU Extension Facts No. 3993, pp. 1-2.

OPTIONAL RESOURCES

Publications

- Barrick, R. Kirby and Hobart L. Harmon. *Animal Production and Management.* New York: Gregg Division, McGraw-Hill Book Company, 1988.
- Ensminger, M.E. *The Stockman's Handbook,* (7th ed.). Danville, IL: Interstate Publishers, Inc., 1992.
- *Measuring Learning and Competency Gains: The Pretest/Posttest Approach.* Stillwater, OK: CIMC, Oklahoma Department of Vocational and Technical Education, 1992. For ordering information call 800-522-5810.
- *The Merck Veterinary Manual,* (7th ed.). Rahway, NJ: Merck & Co., Inc., 1991.
- *NASCO Agricultural Sciences Catalog.* Nasco-Fort Atkinson, 901 Janesville Ave., P.O. Box 901, Fort Atkinson, WI 53538-0901; 800-558-9595, FAX 414-563-8296.
  - *Cattle Ailments – Recognition and Treatment*
  - *Pig Ailments – Recognition and Treatment*
  - *Sheep Ailments*
  - *A Veterinary Book for Dairy Farmers*
  - *Animal Health*
  - *Keeping Livestock Healthy – A Veterinary Guide*
- Publications of Oklahoma State University Cooperative Extension Service, Division of Agricultural Sciences and Natural Resources (F=Fact Sheet, E=Circular, CR=Current Report)
  - F-3999, *Livestock Disease – Cause and Control*

- F-8401, *That's a Good Question - Salmonella and Poultry*
- F-9109, *Bacterial Diseases of Poultry Excluding Respiratory Diseases*
- F-7004, *External Poultry Parasite Controls*
- CR-3901, *Foot Rot Control*

- Schnurrenberger, Paul S., Robert S. Sharman, and Gilbert H. Wise. *Attacking Animal Diseases Concepts and Strategies for Control and Eradication.* Ames, IA: Iowa State University Press, 1987.
- Thedford, Thomas R. *Sheep Health Handbook: A Field Guide for Producers with Limited Veterinary Services.* Winrock International Informational Services Publication in collaboration with Agricultural Experiment Station, Division of Agriculture, University of Arkansas, 1990.

UNIT REFERENCES

Publications

- Barrick, R. Kirby and Hobart L. Harmon. *Animal Production and Management.* New York: Gregg Division, McGraw-Hill Book Company, 1988.
- Berry, Joe G. *Livestock Disease – Cause and Control.* OSU Extension Facts No. 3999.
- Cullen, Patrick T. *Farm Animal Health: A Practical Guide.* Great Britain: Pergamon Press, 1991.
- Ensminger, M.E. *The Stockman's Handbook,* (7th ed.). Danville, IL: Interstate Publishers, Inc., 1992.
- Gillespie, James R. *Modern Livestock & Poultry Production,* (4th ed.). Albany, NY: Delmar Publishers Inc., 1992.
- Thedford, Thomas R. *Sheep Health Handbook: A Field Guide for Producers with Limited Veterinary Services.* Winrock International Informational Services Publication in collaboration with Agricultural Experiment Station, Division of Agriculture, University of Arkansas, 1990.
- Thedford, Thomas R. *A Guide for Developing a Preventive Medicine Program.* OSU Extension Facts No. 3993.

ANSWERS

LIVESTOCK DISEASES AND PARASITES

C-2

ASSIGNMENT SHEETS

OBJECTIVE 7

Assignment Sheet 1

1. a. tick
   b. spray or dust frequently; use parasiticide
2. a. blowfly
   b. use proper procedure for destroying dead animals; use traps, poisoned baits, and repellents
3. a. coccidia
   b. avoid contaminated feed and water; keep feeders and water tanks sanitary; isolate affected animals; consult veterinarian; use coccidiastals
4. a. lungworms
   b. practice good sanitation; do not spread infested manure on pasture; use parasiticide
5. a. louse
   b. spray frequently from October until spring; use Co-Ral, Malathion, or other appropriate parasiticide
6. a. liver flukes
   b. avoid wet pastures; use drench of flukacide
7. a. heel fly (cattle grub)
   b. control flies between June and October; use systemic grub-control insecticide, but not after October 15

8. a. ascarid

   b. clean farrowing quarters; wash sows before farrowing; place sows on clean pasture after farrowing; use parasiticide

9. a. stomach worms

   b. practice pasture rotation; drench with parasiticide

10. a. horn fly

    b. remove manure from around barn; spray animals frequently from early May until frost; use appropriate parasiticide

11. a. gastrointestinal worms

    b. rotate pastures; isolate calves and lambs from adult animals; keep feeders and water tanks sanitary; use parasiticides

12. a. horsefly

    b. keep animals from heavy brush areas; no totally effective spray is available, but frequent spraying for flies helps from May until frost; use Pyrethrins

13. a. mite

    b. spray or dip animals with appropriate insecticide

OBJECTIVE 11

Assignment Sheet 2

☞ **NOTE:** Some diseases have the same symptoms, and questions may have more than one right answer. Evaluate answers according to class discussion and the student's experience.

Part 1:

1. a. pneumonia

   b. isolate infected animals and treat with sulfa drugs and antibiotics; practice good, sound, husbandry and provide good hygienic surroundings

2. a. avian pox (fowl pox)

   b. prevented by vaccination

3. a. transmissible gastroenteritis (TGE)

   b. move and scatter sows that have not farrowed; avoid continuous farrowing; isolate new additions to herd; practice good feeding and management; no effective treatment, but give antibiotics or sulfonamides to prevent secondary infection

4. a. pinkeye

   b. isolate affected animals; treat with antibiotics; provide good nutrition, including vitamin A

5. a. brucellosis (Bang's disease)

   b. no treatment known; slaughter infected animals; vaccinate calves; clean areas of infection thoroughly

6. a. bloat

   b. feed dry hay before putting animal on green, lush pasture; change feed; treat affected animal by giving defoaming agents such as peanut oil, corn oil, or soybean oil by stomach tube; keep the animal on its feet and moving

7. a. botulism

   b. eliminate sources of decayed material; contaminated water is often the source; antitoxin may be used to save a valuable bird

8. a. foot rot

   b. eliminate source of foot injuries; move affected animals to dry quarters; trim inflamed foot and wash with warm, soapy water; disinfect; give sulfa drugs and antibiotics; vaccinate to reduce incidence

9. a. milk fever

   b. keep good supply of vitamins and minerals available; feed a high-phosphorous, low-calcium diet during last ten to fourteen days of pregnancy; treat with injections of calcium glucose given intravenously

10. a. vibriosis

    b. vaccinate two months before breeding animals; use antibiotics; allow sexual rest; practice good sanitation

11. a. bursal disease (Gumboro)

    b. vaccination, there is no treatment

12. a. enterotoxemia (scours, dysentery)

    b. immunization and sanitation, treatment is usually ineffective because of the severity of the onset of the disease

13. a. bovine rhinotracheitis (red nose)

    b. practice good sanitation; isolate infected animals; vaccinate; no specific treatment, but give sulfonamides and antibiotics to combat secondary infections

14. a. swine influenza

    b. provide warm, clean, well-ventilated quarters and ample supply of fresh water; use antibiotics

15. a. nutritional anemia

    b. provide source of nutrient

16. a. omphalitis

    b. isolate flock; drugs used for treatment

17. a. atrophic rhinitis

    b. select breeding stock from herds known to be clean; use clean farrowing quarters; treat with sulfonamide drugs

Part 2:

Answers will vary depending on the disease assigned to individual students.

WRITTEN TEST

OBJECTIVE 1

1. B
2. B
3. C
4. A
5. C
6. B
7. C
8. C
9. C

OBJECTIVE 2

3, 5, 2, 4, 1.

OBJECTIVE 3

1. J
2. E
3. C
4. B
5. D
6. H
7. I

OBJECTIVE 4

horn fly: 2, 4, 1, 3

cattle grub: 4, 2, 6, 5, 1, 3.

OBJECTIVE 5

1. A
2. J
3. H
4. E
5. B
6. D
7. G

OBJECTIVE 6

Answer must include:

1. sanitation, anthelmintics, insecticides
2. • proper housing and ventilation
   • proper pasture rotation
   • proper manure disposal
   • proper carcass disposal
   • isolation of contaminated stock
3. a vet
4. You need to check with a vet before using insecticides.

OBJECTIVE 7

Evaluated on Assignment Sheet 1.

OBJECTIVE 8

Part 1

1.	H	6.	K
2.	F	7.	B
3.	J		
4.	C		
5.	A		

Part 2

1.	G	6.	H
2.	B	7.	F
3.	J		
4.	K		
5.	D		

Part 3

1. E
2. H
3. I
4. L
5. B
6. K
7. D
8. J

Part 4

1. G
2. C
3. E
4. F
5. D
6. I
7. B

OBJECTIVE 9

1. G
2. B
3. C
4. E
5. H
6. I

OBJECTIVE 10

1. Answer must include all of the following, in any order:
   - insure that new, possibly diseased, stock does not contaminate existing stock
   - isolate and treat diseased stock
2. Answer must include all of the following, in any order:
   - proper sanitation techniques
   - quarantine
   - vaccination

3. Answer must include four of the following, in any order:

   - disposal of carcasses
   - disposal of manure
   - pasture rotation
   - stock nutrition
   - eradication of pests, such as rats and mice

4. No. If his stock is diseased you would not want to introduce his diseased stock into your own healthy stock.

OBJECTIVE 11

Evaluated on Assignment Sheet 2.

CIMC
TEST CODE SHEET

VOCATIONAL PROGRAM (BOOK TITLE) ANIMAL SCIENCE

UNIT NUMBER AND TITLE C-2 – LIVESTOCK DISEASES AND PARASITES

TOTAL NUMBER OF TEST QUESTIONS 81

TOTAL NUMBER OF BASIC SKILL QUESTIONS 81

OBJECTIVE NUMBER	TEST QUESTION NUMBER(S)	BASIC SKILL CODE(S)
1	1-9	S
2	1-5	S
3	1-7	S
4	1-10	S
5	1-7	S
6	1-4	S
7	Evaluated on Assignment Sheet 1	
8	Part 1: 1-7, Part 2: 1-8, Part 3: 1-7	S
9	1-6	S
10	1-4	S
11	Evaluated on Assignment Sheet 2	

Required Activities and Resources (R)

These are fully integrated components of this CIMC curriculum. They are usually packaged in or with the curriculum and are essential in meeting the learning objectives. To individualize this unit, use the LAP Sheet supplied in your resources.

- Reproducible Handouts and Transparency Masters are included in the Instructor's Resource Package. Handouts should be copied for all students. Transparency Masters should be used to make overhead transparencies for use during instruction. A small copy of each Transparency Master appears in the student's Information Sheets.
- Non-reproducible resources are included in the student's curriculum.

Optional Activities and Resources (O)

These are suggested high-interest activities to help deliver learning objectives to students or to let students achieve objectives in an applied context. Select as many as you wish to use. Some activities use extra resources for further information about unit content. You can make them available in the classroom for in-depth study or optional activities, but their use is not required for meeting CIMC unit objectives.

FOCUS ASSIGNMENTS

Prereading

Have students read *Swine Nutrition*, by William G. Luce and Charles V. Maxwell, OSU Extension Facts No. 3500.

Writing

Have students write a short essay (one paragraph to one page) about why proper swine nutrition is important for a profitable swine operation.

GENERAL INSTRUCTIONS

Assignment Sheets

- R Review the directions and any specific guidelines.
- R Make certain that any needed materials from the Instructor's Resource Package are available.
- R Have the students complete the Assignment Sheet. Evaluate each student's performance and provide reteaching and retesting as necessary. Have the students repeat the Assignment Sheet until they achieve mastery.
- R Complete each student's Competency Profile.
- O Have the students volunteer to read aloud the directions and any special guidelines.
- O Return the completed Assignment Sheets to the students so that they may use them for later reference if needed.

Job Sheets

- R Review the introduction and evaluation criteria for the Job Sheet. Remind the students that they should not fill in the blanks in the Yes/No columns.
- R Review and explain all general guidelines, safety cautions, and warnings.
- R Make sure that all tools, equipment, and supplies are available.
- R Demonstrate each of the procedures outlined in the Job Sheet.
- R Allow the students to practice the Job Sheet skills before skills testing. Coach, correct, and supervise as necessary.
- R Have the students complete the Job Sheet. Evaluate each student's performance and provide remediation as necessary. Have the students repeat the Job Sheet until they achieve mastery.
- R Complete each student's Competency Profile.
- R Return the completed Job Sheets to the students so that they may use them for later reference if needed.
- O Have the students volunteer to read aloud the job guidelines, cautions, and warnings.

LAP Sheets

The LAP Sheets are an optional component that can be used to individualize instruction. The following instructions should be followed only if you are using the LAP Sheets.

R Explain the specific procedures to be followed to the students before they begin using the LAP Sheet. Be sure that each student understands the procedures for using the LAP Sheet.

R If you want the student to complete any of the assignments on the LAP Sheet that are labeled optional, assign these to the student. Be sure to provide any needed resources.

OBJECTIVE 1 **Choose the word or phrase to complete statements about basic principles of animal nutrition and health.**

O Look at the cost of feeds and additives in your program and in your students' projects.

O Look at the total amount of veterinary care and expenses required for your program and determine how much was related to nutrition.

OBJECTIVE 2 **Arrange in order the digestive process of ruminants.**

R Use Transparency 1 to discuss the major steps in the digestive process of ruminants.

OBJECTIVE 3 **Arrange in order the digestive process of nonruminants.**

R Use Transparency 2 to discuss the major steps in the digestive process of nonruminants.

OBJECTIVE 4 **Arrange in order the digestive process of poultry.**

R Use Transparency 3 to discuss the poultry digestive process.

OBJECTIVE 5 **Choose the word or phrase to complete statements about nutrients, sources, and their actions on animal physiology.**

O Have students read magazine articles and OSU Facts Sheets on nutrition and report to the rest of the class on their reading.

O Show *Beef Cow Nutrition* or another video on nutrition.

OBJECTIVE 6 **Analyze nutritional deficiencies. (Assignment Sheet 1)**

R See the general instructions for all Assignment Sheets.

R Collect and review forms completed by students.

R Copy and distribute forms so that each student has a full set of all students' forms. Students will use the full set when completing Assignment Sheet 11.

OBJECTIVE 7 **Define the categories of feed.**

O Visit a local feed supplier to investigate the different categories of feed available.

OBJECTIVE 8 **Select true statements about the composition of feeds.**

O Have students read OSU Facts Sheet F-3502, *Feedstuff Composition for Swine Rations.*

O Have students examine the ingredients in the feeds used in your program.

OBJECTIVE 9 **State uses of common additives.**

O Show *BST: Continuing a Dairy Tradition* or another video on BST, a growth hormone used to increase milk production in cows.

O Invite a local livestock manager to discuss the use of additives.

OBJECTIVE 10 **Compare the composition, nutrients, supplements, and additives in different commercial feeds. (Assignment Sheet 2)**

R See the general instructions for all Assignment Sheets.

R Recommend locations where students may be able to obtain three commercial feed tags needed to complete the Assignment Sheet.

OBJECTIVE 11 **List factors to consider when buying feed.**

O Visit a local feed supplier to investigate the types of feed available.

OBJECTIVE 12 **Compare the cost of feeds with specific additives. (Assignment Sheet 3)**

R See the general instructions for all Assignment Sheets.

OBJECTIVE 13

Select true statements about proper feed storage and handling practices.

O Visit several local livestock operations so students can see different storage and handling practices.

OBJECTIVE 14

Design a feed storage area. (Assignment Sheet 4)

R See the general instructions for all Assignment Sheets.

R Make arrangements with two or three storage facilities that students can visit.

OBJECTIVE 15

Discuss energy values.

R Use Transparency 4 to discuss the utilization of energy in a net-energy system.

OBJECTIVE 16

Choose the word or phrase to complete statements about net-energy.

R Copy and distribute Handout 1.

O Invite a livestock manager who utilizes net-energy to discuss the practical applications of net-energy.

OBJECTIVE 17

Select true statements about balanced rations.

R Review the Pearson square method of calculating rations.

OBJECTIVE 18

Use the Pearson square to balance rations. (Assignment Sheet 5)

R See the general instructions for all Assignment Sheets.

OBJECTIVE 19

Determine proper nutrient and water requirements for livestock in various stages of production. (Assignment Sheet 6)

R See the general instructions for all Assignment Sheets.

R Copy and distribute Handouts 2, 3, 4, 5, and 6.

OBJECTIVE 20

Use a computer program to balance rations. (Assignment Sheet 7)

R See the general instructions for all Assignment Sheets.

R Distribute the AUTONRCA program, the instruction sheet, and the OSU Current Report No. 3027 (*Spreadsheet Programs*

for Calculating Complete Diets for Beef Cattle, Checking for Nutrient Balance and Estimating Gain) to each student.

R Review the basic key strokes necessary to use the program.

OBJECTIVE 21 **Calculate balanced rations for livestock on a hypothetical farm. (Assignment Sheet 8)**

R See the general instructions for all Assignment Sheets.

R Review the hypothetical farm of each student before the student calculates the balanced rations.

R Be sure students have Handouts 2-5.

OBJECTIVE 22 **Choose the word or phrase to complete statements about poultry feed.**

O Visit a poultry operation to see feeding operations.

OBJECTIVE 23 **Choose the word or phrase to complete statements about pasture requirements and grazing systems.**

O Visit a local ranch to investigate the quality of the forage and the grazing method used at the ranch.

OBJECTIVE 24 **Identify pasture requirements. (Assignment Sheet 9)**

R See the general instructions for all Assignment Sheets.

R Distribute copies of OSU Extension Facts No. 2568, *Protein-Nitrogen Relationships in Forages.*

OBJECTIVE 25 **Develop a grazing plan. (Assignment Sheet 10)**

R See the general instructions for all Assignment Sheets.

R Distribute copies of OSU Extension Facts No. 2584, *Forage Planning Guidelines.*

OBJECTIVE 26 **Analyze nutritional problems according to species. (Assignment Sheet 11)**

R See the general instructions for all Assignment Sheets.

R Copy and distribute the nutritional deficiency forms collected in Assignment Sheet 1.

EVALUATION

Pretest

- Use the unit Written Test for *both* the pretest and posttest. Give the students the pretest before they begin the unit.
- You may wish to use the CIMC publication *Measuring Learning and Competency Gains: The Pretest/Posttest Approach* for instructions and suggestions on giving pretests and using the results. Information for ordering this material is included in the optional resources section.
- Use pretest results to guide individual students in progressing through the unit, doing enrichment work, or moving to the next unit.

Focus Assignment

- Use an informal evaluation of the focus assignments as a diagnostic tool for determining if any students need extra help in reading comprehension or writing skills. Refer these students to their English instructor, Learning Resource Center, or Educational Enhancement Center.

Assignment Sheet

- Evaluate students on Assignment Sheet activities. Students must repeat an Assignment Sheet until they have mastered the activity.
- Complete each student's Competency Profile.

Skill Test

- Explain to the students that they will be asked to demonstrate the procedures on the Job Sheets as a skills test.
- Describe the rating scale used on the skills test.
- Reteach and retest as necessary.
- Complete each student's Competency Profile.

Posttest

- After they have completed the unit, give students the Written Test again.

- Explain to the students that they will be asked to demonstrate on the Written Test actions listed in the specific objectives.

- You may wish to use the CIMC publication *Measuring Learning and Competency Gains: The Pretest/Posttest Approach* for instructions and suggestions on giving posttests and using the results. Information for ordering this material is included in the optional resources section.

- Reteach and retest as necessary to meet individual student needs and state standards for student learning and competency gains.

- Complete the appropriate sections of the Competency Profiles.

- Review individual and group performance to evaluate teaching effectiveness. Adjust scope, sequence, or instructional methods for additional lessons as required.

REQUIRED RESOURCES

The items marked with an asterisk are included in the Instructor's Resource Package.

Publications

- * Gill, D.R., K.S. Lusby and F.N. Owens. *Spreadsheet Programs for Calculating Complete Diets for Beef Cattle, Checking for Nutrient Balance and Estimating Gain (AUTONRCA & AUTONRCD)*, OSU Current Report No. 3027. Stillwater, OK: Oklahoma State University, n.d.

- Luce, William G., and Charles V. Maxwell. *Swine Nutrition*, OSU Extension Facts No. 3500. Stillwater, OK: Oklahoma State University, n.d.

- Rommann, Loren. *Protein - Nitrogen Relationships in Forages*, OSU Extension Facts No. 2568. Stillwater, OK: Oklahoma State University, n.d.

- Woods, Robert L., and Loren Rommann. *Forage Planning Guidelines*, OSU Extension Facts No. 2584. Stillwater, OK: Oklahoma State University, n.d.

Computer Software

- * *AUTONRCA: Spreadsheet Program for Calculating Complete Diets for Beef Cattle.* Agricultural Extension, Oklahoma State University, Stillwater, Oklahoma. Contact Dr. Keith Lusby, 405-744-6060, for more information.

OPTIONAL RESOURCES

Publications

- *Measuring Learning and Competency Gains: The Pretest/Posttest Approach.* Stillwater, OK: CIMC, Oklahoma Department of Vocational and Technical Education, 1992. For ordering information call 800-522-5810.

- Oklahoma State University Extension Service publications (CR=Current Report, F=Extension Facts, E=Circular)

  - **Beef Cattle:**

    - CR-304, *Program to Estimate Feedlot Cost of Gain (FLCALC)*
    - CR-3024, *Spreadsheet for Calculating Livestock Rations*
    - CR-3025, *Programmed Feeding for Calves*
    - CR-3027, *Spreadsheet: Calculating Complete Diet for Beef Cattle, Checking for Nutrient Balance and Estimating Gain*
    - CR-3253, *How to Calculate the Value of Supplementing Grazing Stocker Cattle*
    - CR-3273, *Program to Estimate Feedlot Breakeven Purchase Price*
    - E-861, *Mineral Nutrition of Grazing Cattle*
    - E-884, *Improving Pasture and Feedlot Profitability of Fescue Cattle*
    - E-900, *Receiving and Growing Rations*
    - F-3008, *Limiting Feed Intake with Salt*
    - F-3013, *Stocker Cattle Nutrition II: Formulating Complete Rations*
    - F-3014, *Stocker Cattle Nutrition III: Formulating Supplements*
    - F-3015, *Utilizing Hay as a Winter Supplement*
    - F-3016, *Feeding Medium Protein Range Cubes*
    - F-3017, *Feeding High Protein Range Cubes*

- F-3022, *Ranchers' Guide to Custom Feeding Cattle*
- F-3023, *OSU Stocker Planner*

- **Dairy Cattle:**
  - F-4002, *Nutrient Requirements of Dairy Cattle*
  - F-4009, *Evaluating Feeds for the Dairy Ration*
  - F-4010, *Rations for the Dairy Herd*
  - F-4012, *Group Feeding of the Dairy Herd*
  - F-4013, *Utilization and Value of Alfalfa in Dairy Rations*
  - F-4014, *Minerals and Vitamins for Dairy Cattle*

- **Sheep:**
  - F-3860, *Sheep Health and Management*

- Swine:
  - CR-3505, *OSUSWINE: Spreadsheet Program to Balance Swine Rations*
  - CR-3507, *Calculation of Complete Diets for Swine and Checking for Nutrient Balance*
  - CR-3508, *Diets for Early Weaned Pigs*
  - CR-3509, *Protein Needs of High Lean Gain Pigs*
  - F-3500, *Swine Nutrition*
  - F-3501, *Formulating Swine Rations*
  - F-3502, *Feedstuff Composition for Swine Rations*
  - F-3503, *Relative Value of Grains for Market Hogs*
  - F-3504, *Feeding Wheat to Hogs*
  - F-3506, *Using Mung Beans in Swine Rations*
  - F-3653, *Management and Nutrition of the Bred Gilt and Sow*
  - F-3654, *Management of Growing-Finishing Swine*

- F-3656, *Buying and Managing Feeder Pigs*

- *The Merck Veterinary Manual*, (7th ed.). Rahway, NJ: Merck & Co., Inc. 1991.

- *NASCO Agricultural Sciences Catalog*. Nasco-Fort Atkinson, 901 Janesville Ave., P.O. Box 901, Fort Atkinson, WI 53538-0901; 800-558-9595, FAX 414-563-8296.

  - *Feeds and Feeding*, Arthur E. Cullison
  - *Livestock Feeds and Feeding*, D. C. Church
  - *Animal Feeding and Nutrition*, Marshall H. Jurgens

Videos

- Videotapes available from the OSU Cooperative Extension Videotape Library (VT=educational or promotional videotape):

  - VT65A, *Beef Cow Nutrition*
  - VT65B, *Supplementing Beef Cattle*
  - VT176, *BST: Continuing a Dairy Tradition*

- Videotapes available from CEV, P.O. Box 65265, Lubbock, Texas 79464-5265:

  - *Energy Utilization in Feedlot Cattle*
  - *The Feedyard*

UNIT REFERENCES

Publications

- Barrick, R. Kirby and Hobart L. Harmon. *Animal Production and Management*. New York: Gregg Division, McGraw-Hill Book Company, 1988.

- Cullen, Patrick T. *Farm Animal Health: A Practical Guide*. Great Britain: Pergamon Press, 1991.

- Ensminger, M.E. *The Stockman's Handbook*, (7th ed.). Danville, IL: Interstate Publishers, Inc., 1992.

- Gillespie, James R. *Modern Livestock & Poultry Production*, (4th ed.). Albany, NY: Delmar Publishers Inc., 1992.

- Herren, Ray V. and Roy L. Donahue. *The Agriculture Dictionary*. Albany, New York: Delmar Publishers, Inc., 1991.

- Moody, E. Grant. *Raising Small Animals*. Ezra Taft Benson Agriculture and Food Institute, Ipswich, United Kingdom: Farming Press Books, 1991.

- Oklahoma State University Extension Service publications (CR=Current Report, F=Extension Facts, E=Circular)

  - **Beef Cattle:**

    - CR-304, *Program to Estimate Feedlot Cost of Gain (FLCALC)*
    - CR-3024, *Spreadsheet for Calculating Livestock Rations*
    - CR-3025, *Programmed Feeding for Calves*
    - CR-3027, *Spreadsheet: Calculating Complete Diet for Beef Cattle, Checking for Nutrient Balance and Estimating Gain*
    - CR-3253, *How to Calculate the Value of Supplementing Grazing Stocker Cattle*
    - CR-3273, *Program to Estimate Feedlot Breakeven Purchase Price*
    - E-861, *Mineral Nutrition of Grazing Cattle*
    - E-884, *Improving Pasture and Feedlot Profitability of Fescue Cattle*
    - E-900, *Receiving and Growing Rations*
    - F-3008, *Limiting Feed Intake with Salt*
    - F-3013, *Stocker Cattle Nutrition II: Formulating Complete Rations*
    - F-3014, *Stocker Cattle Nutrition III: Formulating Supplements*
    - F-3015, *Utilizing Hay as a Winter Supplement*
    - F-3016, *Feeding Medium Protein Range Cubes*
    - F-3017, *Feeding High Protein Range Cubes*

- F-3656, *Buying and Managing Feeder Pigs*

- Pierce, Greg. *Agricultural Livestock Skills.* Stillwater, OK: CIMC, Oklahoma Department of Vocational and Technical Education, 1979.

- Stamm, G. W. *Veterinary Guide for Farmers.* New York: The Hearst Corporation, 1975.

Computer Software

- *AUTONRCA: Spreadsheet Program for Calculating Complete Diets for Beef Cattle.* Agricultural Extension, Oklahoma State University, Stillwater, Oklahoma.

ASSIGNMENT SHEETS

OBJECTIVE 6

Assignment Sheet 1

Answers will vary depending on the nutritional deficiency assigned to students and the resources available.

OBJECTIVE 10

Assignment Sheet 2

Part 1:

Make sure students have three different feed tags.

Part 2:

Answers will vary depending on the feed tags acquired by students. The table should be complete.

Part 3:

Answers will vary depending on the feed tags acquired by students. The essay should include a discussion of the purpose for each type of feed and how the components will fulfill that purpose. Correct spelling and grammar should be used.

OBJECTIVE 12

Assignment Sheet 3

Part 1:

Answers will vary depending on the feed or additive assigned to the student. Forms should be complete.

Part 2:

Answers will vary depending on the feeds and additives researched in Part 1. The tables should be neat and well organized.

Part 3:

Answers will vary but should include topics such as:

- the price increases as the protein level increases
- natural protein is more expensive than urea
- excellent quality hay is more expensive than good quality hay
- processed (crimped) corn is more expensive than whole corn
- additives increase the price of feeds

OBJECTIVE 14

Assignment Sheet 4

Answers will vary. Individual charts should use a scale of ¼ inch = 1 foot, be neat, accurate, and should include the following:

- number and type of livestock serviced
- location (for example: Minnesota or Oklahoma)
- storage capacity
- types of feed stored
- rodent and insect controls
- equipment used to move feed
- fire and other safety equipment

OBJECTIVE 18

Assignment Sheet 5

1.

Parts	Percentages	Pounds	
22	88%	1760	**Barley**
3	12%	240	**Supplement**

2.	Parts	Percentages	Pounds	
	24	64%	1280	**Corn**
	13.4	36%	720	**Supplement**

3.	Parts	Percentages	Pounds	
	16.75	40%	800	**Milo**
	16.75	40%	800	**Corn**
	4.15	10%	200	**Soybean meal**
	4.15	10%	200	**Bone scraps**

OBJECTIVE 19

Assignment Sheet 6

Answers should be in complete sentences and include the following:

1. 6 lb to 8 lb of 16% crude protein
2. 3.5 lb alfalfa/grass mixed
3. 5 lb alfalfa/grass mixed
4. 5% of body weight = 7 lb
5. 30 lb alfalfa/grass mixed
6. 2 lb of 12% CP
7. a. 2.5% of their body weight
   b. 50% roughage and 50% concentrate (CP level depending on the rate of gain desired)
8. The additional calcium causes the bones to fuse.
9. 8.4 lb of 13% crude protein
10. 17.5 lb of feed
11. As the pig increases in weight, the percentage of crude protein required decreases.
12. a. ram
    b. 2 lb of alfalfa/grass mixed
13. The pasture provides some of the necessary crude protein.

14. Bred sows require less crude protein than nursing sows.

15. a. 10 lb of 14% to 16% CP

    b. 15 lb of 14% to 16% CP

16. 500 gallons

17. a. 171 gallons

    b. 230 gallons

    c. six

OBJECTIVE 20

Assignment Sheet 7

Part 1:

1.

alfalfa hay, good	limestone 38%
cottonseed hulls	salt
corn dent no. 2	Rumensin 60
cane molasses	Tylan 40
soymeal 44	vitamin A-30,000
wheat midds	urea

2. weight: 650 lb

   body type: #6, medium-frame steer calf

   amount of feed fed: 19 lb per day

3. yes

4. sulfur and cobalt

5. $5.05

6. 3.42 lb

7. 87.69%

8. barley; corn dent no. 2; milo, roll, grnd; oats; and wheat

9. 1.56%

10. 20 lb

Part 2:

1. no
2. $4.99
3. 2.34 lb
4. The price increases to $5.42 per day because Rumensin 60 is a very expensive component.

Part 3:

Answers will vary. Check the spreadsheet for the following:

- 700 lb medium-frame heifer
- weight gain of at least 3 lb per day
- balanced ration using ingredients that are readily available in your area
- reasonable cost per day

OBJECTIVE 21

Assignment Sheet 8

Answers will vary. The presentation should be clear and concise.

OBJECTIVE 24

Assignment Sheet 9

Answers should be similar to the following:

1. As plants grow older, the quality as measured by both protein and digestibility declines rapidly.
2. The amount of forage decreases as digestibility declines because it takes longer for forage to pass through the digestive system.
3. a. McClain County

   b. sodium, copper
4. Nitrogen is an atom that is essential for the formation of amino acids – every amino acid contains nitrogen. Increasing nitrogen by fertilizing enables plants to produce proteins.

5. Protein is both a critical feed component and an expensive component.

6. The amount of crude protein increases as the amount of nitrogen fertilizer increases.

7. Nitrogen should be applied every three to six weeks.

8. You should continuously be making management decisions as prices change and technology develops.

9. Purchase protein supplement.

OBJECTIVE 25

Assignment Sheet 10

1. 275 days
2. 30 lbs
3. 0.8 tons per acre
4. 545 lbs
5. 380 lbs
6. 64 tons
7. 40 tons
8. 29.1 tons
9. a. No. You need at least 127.2 tons of forage to support the current herd plus the additional twenty calves.

   b. 152 tons

   c. yes

   d. No. 50 lbs of fertilizer per acre is enough. Fertilizer costs money so you would not want to use extra fertilizer.

OBJECTIVE 26

Assignment Sheet 11

1. founder
2. night blindness
3. rickets

4. weak calf syndrome
5. pasture bloat or feedlot bloat
6. anemia, nutritional
7. acidosis
8. milk fever
9. osteomalacia
10. parakeratosis
11. white muscle disease

WRITTEN TEST

OBJECTIVE 1

1. C
2. D
3. B
4. A
5. B

OBJECTIVE 2

The order should be: 5, 2, 7, 4, 1, 9, 3, 6, 8.

OBJECTIVE 3

The order should be: 3, 2, 6, 1, 5, 4.

OBJECTIVE 4

The order should be: 6, 3, 4, 1, 5, 2, 7.

OBJECTIVE 5

1. D
2. A
3. B
4. C
5. A
6. B

OBJECTIVE 6

Evaluated on Assignment Sheet 1.

OBJECTIVE 7

1. feeds that are high in cellulose or fiber and relatively low in digestible nutrients
2. feeds that are low in fiber and relatively high in digestible nutrients
3. "extras" like salt or mineral block that supply specific nutrients
4. compounds added to feed to preserve it or to alter animal metabolism
5. supplies only those nutrients necessary to maintain an animal's normal body function
6. supplies nutrients above maintenance level, allowing an animal to build and expand body parts
7. supplies nutrients to produce fat after maintenance and growing requirements are met
8. supplies nutrients to produce such items as milk, eggs, or wool
9. supplies additional nutrients needed during breeding activity and pregnancy
10. supplies additional nutrients needed by working animals
11. given to females prior to breeding to increase body weight

OBJECTIVE 8

2, 3, 5, 6, 7

OBJECTIVE 9

1. used to supplement nutritional needs
2. used extensively in improving beef production; they are used rarely in swine and poultry production
3. provide necessary nutrients for proper development and growth
4. used as a protein (nitrogen) supplement
5. used to influence certain animal performance
6. used to inhibit the growth of disease-causing bacteria

OBJECTIVE 10 **Evaluated on Assignment Sheet 2.**

OBJECTIVE 11 Answer must include any seven of the following, in any order:

- type of livestock
- palatability
- protein level
- performance expected from your livestock
- quantity
- condition and size of your storage facility
- price in relation to feeding value
- alternative feed sources
- reputation of the manufacturer

OBJECTIVE 12 **Evaluated on Assignment Sheet 3.**

OBJECTIVE 13 **Storage problems:** 1, 3, 4

Requirements for a storage facility: 1, 3, 4

Factors that determine feed storage area requirements: 3, 5

OBJECTIVE 14 **Evaluated on Assignment Sheet 4.**

OBJECTIVE 15 1. Answer must include any five of the following, in any order:

- growth
- the onset of puberty
- the quantity of milk produced by lactating females

- body weight
- fertility and the estrus cycle
- wool quality and quantity (sheep)
- mortality rate
- resistance to diseases and parasites

2. Carbohydrates are readily available, easily digested, and cost effective.

3. TDN is widely used because people are familiar with it and it can be expressed in pounds and percentages (useful units when dealing with feed).

4. Answer must include any three of the followng, in any order:
   - not related to actual metabolism
   - does not take into consideration energy losses other than fecal losses
   - places too much value on roughages
   - additional disadvantages introduced during class discussion

5. Energy values are more accurate and take into consideration energy losses throughout the entire digestive process.

6. calories (c), kilocalories (kcal), or megacalories (Mcal)

7. Net energy is the energy available for maintenance or gain.

8. Gross energy is the total combustible energy in a ration.

9. Digestible energy is the portion of the ration's gross energy that is not excreted in the feces. It takes into consideration urine and gas losses.

OBJECTIVE 16

1. A
2. B
3. A
4. C
5. D

OBJECTIVE 17

2, 3, 4, 6

OBJECTIVE 18

Evaluated on Assignment Sheet 5.

OBJECTIVE 19

Evaluated on Assignment Sheet 6.

OBJECTIVE 20

Evaluated on Assignment Sheet 7.

OBJECTIVE 21

Evaluated on Assignment Sheet 8.

OBJECTIVE 22

1. A
2. C
3. D
4. D
5. C
6. A
7. B
8. A

OBJECTIVE 23

1. B
2. C
3. A
4. D
5. A
6. B
7. D
8. C
9. D
10. B

OBJECTIVE 24	**Evaluated on Assignment Sheet 9.**
OBJECTIVE 25	**Evaluated on Assignment Sheet 10.**
OBJECTIVE 26	**Evaluated on Assignment Sheet 11.**

CIMC
TEST CODE SHEET

VOCATIONAL PROGRAM (BOOK TITLE) ANIMAL SCIENCE

UNIT NUMBER AND TITLE C-3 – NUTRITION, FEEDS, AND ADDITIVES

TOTAL NUMBER OF TEST QUESTIONS 118

TOTAL NUMBER OF BASIC SKILL QUESTIONS 96

OBJECTIVE NUMBER	TEST QUESTION NUMBER(S)	BASIC SKILL CODE(S)
1	1-5	S
2	1-9	S
3	1-6	S
4	1-7	S
5	1-6	S
6	Evaluated on Assignment Sheet 1	
7	1-11	W, S
8	1-8	S
9	1-6	S
10	Evaluated on Assignment Sheet 2	
11	1-7	S
12	Evaluated on Assignment Sheet 3	
13	Problems 1-5, Facility 1-5, Area Requirements 1-5	X
14	Evaluated on Assignment Sheet 4	

CIMC
TEST CODE SHEET

VOCATIONAL PROGRAM (BOOK TITLE) ANIMAL SCIENCE

UNIT NUMBER AND TITLE C-3 – NUTRITION, FEEDS, AND ADDITIVES

OBJECTIVE NUMBER	TEST QUESTION NUMBER(S)	BASIC SKILL CODE(S)
15	1-9	W, S
16	1-5	S
17	1-6	S
18	Evaluated on Assignment Sheet 5	
19	Evaluated on Assignment Sheet 6	
20	Evaluated on Assignment Sheet 7	
21	Evaluated on Assignment Sheet 8	
22	1-8	S
23	1, 3, 6	S
23	2, 4, 5, 7-10	X
24	Evaluated on Assignment Sheet 9	
25	Evaluated on Assignment Sheet 10	
26	Evaluated on Assignment Sheet 11	

VACCINATION AND DRUGS

C-4

Required Activities and Resources (R)

These are fully integrated components of this CIMC curriculum. They are usually packaged in or with the curriculum and are essential in meeting the learning objectives. To individualize this unit, use the LAP Sheet supplied in your resources.

- Reproducible Handouts and Transparency Masters are included in the Instructor's Resource Package. Handouts should be copied for all students. Transparency Masters should be used to make overhead transparencies for use during instruction. A small copy of each Transparency Master appears in the student's Information Sheets.

- Non-reproducible resources are included in the student's curriculum.

Optional Activities and Resources (O)

These are suggested high-interest activities to help deliver learning objectives to students or to let students achieve objectives in an applied context. Select as many as you wish to use. Some activities use extra resources for further information about unit content. You can make them available in the classroom for in-depth study or optional activities, but their use is not required for meeting CIMC unit objectives.

FOCUS ASSIGNMENTS

Prereading

R Have students read Handout 1, "What Makes This Cattle Herd So Efficient?" by John Leidner, published in the February, 1994 issue of *The Progressive Farmer*.

Writing

R Have students write a short (one paragraph to one page) essay that summarizes the management practices that make Butch Lovelady's operation successful.

GENERAL INSTRUCTIONS

Assignment Sheets

- R Review the directions and any specific guidelines.
- R Make certain that any needed materials from the Instructor's Resource Package are available.
- R Have the students complete the Assignment Sheet. Evaluate each student's performance and provide reteaching and retesting as necessary. Have the students repeat the Assignment Sheet until they achieve mastery.
- R Complete each student's Competency Profile.
- O Have the students volunteer to read aloud the directions and any special guidelines.
- O Return the completed Assignment Sheets to the students so that they may use them for later reference if needed.

Job Sheets

- R Review the introduction and evaluation criteria for the Job Sheet. Remind the students that they should not fill in the blanks in the Yes/No columns.
- R Review and explain all general guidelines, safety cautions, and warnings.
- R Make sure that all tools, equipment, and supplies are available.
- R Demonstrate each of the procedures outlined in the Job Sheet.
- R Allow the students to practice the Job Sheet skills before skills testing. Coach, correct, and supervise as necessary.
- R Have the students complete the Job Sheet. Evaluate each student's performance and provide remediation as necessary. Have the students repeat the Job Sheet until they achieve mastery.
- R Complete each student's Competency Profile.
- R Return the completed Job Sheets to the students so that they may use them for later reference if needed.
- O Have the students volunteer to read aloud the job guidelines, cautions, and warnings.

LAP Sheets

The LAP Sheets are an optional component that can be used to individualize instruction. The following instructions should be followed only if you are using the LAP Sheets.

R Explain the specific procedures to be followed to the students before they begin using the LAP Sheet. Be sure that each student understands the procedures for using the LAP Sheet.

R If you want the student to complete any of the assignments on the LAP Sheet that are labeled optional, assign these to the student. Be sure to provide any needed resources.

OBJECTIVE 1

Choose the word or phrase to complete statements about immunity, vaccination, and drugs.

O Show students the vaccination and animal health products you keep in stock for your program. Discuss what they are used for and how they are administered.

O Compare human immunity with animal immunity, including human diseases such as measles, smallpox, polio, and tetanus.

O Invite a veterinarian to discuss drugs in general and the legal and ethical factors that affect their use.

OBJECTIVE 2

Select from a list true statements about types of animal health products.

R Have students read the section on types of immunity and types of biological products in *Vaccines – Their Use, Handling, and Care*, OSU Facts Sheet No. 9100, by T. R. Thedford, D.V.M.

O Have students count and analyze animal health products advertised or discussed in a magazine related to animal production.

O You may want to photocopy and distribute Handouts 2 and 3 at this time or to support objective 3.

O Show students catalogs of various veterinary pharmaceutical manufacturers and distributors.

OBJECTIVE 3 — **Choose the word or phrase to complete statements about standard medications.**

- O Photocopy and distribute Handouts 2 and 3 on recommended vaccination times if you haven't already done so.
- O Refer to Unit C-2, "Livestock Diseases and Parasites" for information about the diseases.
- O Refer students to a good animal health reference and show them how to use it.

OBJECTIVE 4 — **Select from a list label requirements for animal health care products.**

- O Have students study and compare the information on labels of products used in your program or that they bring from home.

OBJECTIVE 5 — **Interpret information on animal health product labels. (Assignment Sheet 1)**

- R See the general instructions for all Assignment Sheets.

OBJECTIVE 6 — **Complete guidelines for using animal health products.**

- R Have students read the section on how to handle and care for vaccines in *Vaccines – Their Use, Handling, and Care*. OSU Facts Sheet No. 9100.
- O Compare the short-term and long-term costs of using products that are too old or that have lost their effectiveness because of improper handling.

OBJECTIVE 7 — **Discuss anaphylaxis.**

- O Have students research epinephrine and learn where it comes from, what it does, and how it works.

OBJECTIVE 8 — **Select from a list factors to consider when calculating mixes or determining dosage levels for animal health products.**

- O Have students read and compare dosage levels and mixing instructions for several similar and dissimilar products.

OBJECTIVE 9 — **Calculate mixes and dosage levels for animal health products. (Assignment Sheet 2)**

- R See the general instructions for all Assignment Sheets.

OBJECTIVE 10 **Match methods of administering medicine to their descriptions.**

R Teach objectives 10 and 11 together.

OBJECTIVE 11 **Match equipment used to administer livestock medications and monitor health care to their descriptions.**

O Display equipment used and explain and demonstrate their use.

O Invite a local supplier to show various types and sizes of equipment and discuss their use.

OBJECTIVE 12 **Drench an animal. (Job Sheet 1)**

R See the general instructions for all Job Sheets.

OBJECTIVE 13 **Administer paste. (Job Sheet 2)**

R See the general instructions for all Job Sheets.

OBJECTIVE 14 **Administer a bolus. (Job Sheet 3)**

R See the general instructions for all Job Sheets.

OBJECTIVE 15 **Install an insecticide ear tag. (Job Sheet 4)**

R See the general instructions for all Job Sheets.

OBJECTIVE 16 **Select from a list guidelines for giving injections.**

O Show the vaccination/injection portion of *Management Practices for Beef Cattle-I, Swine Management Practices-II, Beef Cattle Implanting, Horn Tipping, Castrating, and Vaccinating* or other video.

OBJECTIVE 17 **Label the parts of a syringe.**

R Dismantle several types of syringes and allow students to examine, identify, and handle the parts.

R Show Transparency 1.

OBJECTIVE 18 **Discuss guidelines for syringe use and care.**

O Demonstrate how to sterilize and handle a syringe.

OBJECTIVE 19 **Match types of injections to their descriptions.**

R Teach objectives 19 and 20 together.

R Show Transparency Masters 2-10.

OBJECTIVE 20 **Identify injection sites.**

O Demonstrate on live animals when possible.

OBJECTIVE 21 **Fill a syringe. (Job Sheet 5)**

R See the general instructions for all Job Sheets.

OBJECTIVE 22 **Give an intramuscular injection. (Job Sheet 6)**

R See the general instructions for all Job Sheets.

OBJECTIVE 23 **Give a subcutaneous injection. (Job Sheet 7)**

R See the general instructions for all Job Sheets.

OBJECTIVE 24 **Discuss using growth stimulants.**

O Invite a livestock producer to discuss the use of hormones.

OBJECTIVE 25 **Select from a list true statements about legal and ethical aspects of using growth hormones.**

O Invite a consumer advocate, a veterinarian, and a livestock producer to discuss the legal and ethical aspects of using growth hormones.

O Have students make a graph with the information in Table 3.

O Encourage students to use the *Reader's Guide to Periodic Literature* to research recent attitudes and findings on the use of hormones.

OBJECTIVE 26 **Select from a list true statements about administering growth stimulants.**

O Provide several pellets for students to examine and handle.

OBJECTIVE 27

Choose the word or phrase to complete statements about growth stimulants.

O Discuss the types of hormones used in your region.

O Create gain and efficiency problems to help students understand how using hormones can be cost effective.

OBJECTIVE 28

State methods other than growth stimulants that improve the rate and efficiency of gain.

O Have students research genetic improvements that improve gain.

O Examine your current feed programs and determine how they could be adjusted to improve the quality, digestibility, and palatability.

OBJECTIVE 29

Implant cattle and sheep. (Job Sheet 8)

R See the general instructions for all Job Sheets.

OBJECTIVE 30

Report on new technology and developments in vaccinations and drugs. (Assignment Sheet 3)

R See the general instructions for all Assignment Sheets.

EVALUATION

Pretest

- Use the unit Written Test for *both* the pretest and posttest. Give the students the pretest before they begin the unit.
- You may wish to use the CIMC publication *Measuring Learning and Competency Gains: The Pretest/Posttest Approach* for instructions and suggestions on giving pretests and using the results. Information for ordering this material is included in the optional resources section.
- Use pretest results to guide individual students in progressing through the unit, doing enrichment work, or moving to the next unit.

Focus Assignment

- Use an informal evaluation of the focus assignments as a diagnostic tool for determining if any students need extra help in reading comprehension or writing skills. Refer these students to their English instructor, Learning Resource Center, or Educational Enhancement Center.

Assignment Sheet

- Evaluate students on Assignment Sheet activities. Students must repeat an Assignment Sheet until they have mastered the activity.
- Complete each student's Competency Profile.

Skill Test

- Explain to the students that they will be asked to demonstrate the procedures on the Job Sheets as a skills test.
- Describe the rating scale used on the skills test.
- Reteach and retest as necessary.
- Complete each student's Competency Profile.

Posttest

- After they have completed the unit, give students the Written Test again.
- Explain to the students that they will be asked to demonstrate on the Written Test actions listed in the specific objectives.
- You may wish to use the CIMC publication *Measuring Learning and Competency Gains: The Pretest/Posttest Approach* for instructions and suggestions on giving posttests and using the results. Information for ordering this material is included in the optional resources section.
- Reteach and retest as necessary to meet individual student needs and state standards for student learning and competency gains.
- Complete the appropriate sections of the Competency Profiles.
- Review individual and group performance to evaluate teaching effectiveness. Adjust scope, sequence, or instructional methods for additional lessons as required.

REQUIRED RESOURCES

The items marked with an asterisk are included in the Instructor's Resource Package.

Publications

- *"What Makes This Cattle Herd So Efficient?" by John Leidner, published in the February, 1994 issue of *The Progressive Farmer.*
- *Vaccines – Their Use, Handling, and Care*, OSU Facts Sheet No. 9100, by T. R. Thedford, D.V.M.

OPTIONAL RESOURCES

Publications

- *Measuring Learning and Competency Gains: The Pretest/Posttest Approach.* Stillwater, OK: CIMC, Oklahoma Department of Vocational and Technical Education, 1992. For ordering information call 800-522-5810.
- Oklahoma Cooperative Extension Service publications (F=Fact Sheet):
  - F-3993, *A Guide for Developing a Preventative Medicine Program*
  - F-3999, *Livestock Disease – Cause and Control*
  - F-4270, *Avoid Drug Residues in Milk and Meat*

Videos

- *Management Practices for Beef Cattle-I, Swine Management Practices-II.* Creative Educational Video, P.O. Box 65265, Lubbock, TX 79424-5265. For ordering information call 800-922-9965.
- Oklahoma Cooperative Extension Service (VT=Videotape)
  - VT109, *Beef Cattle Implanting, Horn Tipping, Castrating, and Vaccinating.*
  - VT66, *Brucellosis: Stop It At Home Before It Stops the State.*
  - VT176, *BST: Continuing a Dairy Tradition*
  - VT255, *Adventures in Animal Health* (4-H)

UNIT REFERENCES

Publications

- *Advanced Animal Science.* AS300A Series, Michigan Agriscience and Natural Resources Advanced/Specialized Curriculum. Michigan: State Administrative Board, 1991.
- Barrick, R. Kirby and Hobart L. Harmon. *Animal Production and Management.* New York: Gregg Division, McGraw-Hill Book Company, 1988.
- Ensminger, M.E. *The Stockman's Handbook,* (7th ed.). Danville, IL: Interstate Publishers, Inc., 1992.
- Gillespie, James R. *Modern Livestock & Poultry Production,* (4th ed.). Albany, NY: Delmar Publishers Inc., 1992.
- Herren, Ray V. *The Science of Animal Agriculture.* Albany, NY: Delmar Publishers Inc., 1993.
- Herren, Ray V. and Roy L. Donahue. *The Agriculture Dictionary.* Albany, NY: Delmar Publishers, Inc., 1991.
- Moody, E. Grant. *Raising Small Animals.* Ezra Taft Benson Agriculture and Food Institute, Ipswich, UK: Farming Press Books, 1991.
- Pierce, Greg. *Agricultural Livestock Skills.* Stillwater, OK: CIMC, Oklahoma Department of Vocational and Technical Education, 1979.
- Stamm, G. W. *Veterinary Guide for Farmers.* New York: The Hearst Corporation, 1975.
- Taylor, Robert E. *Scientific Farm Animal Production: An Introduction to Animal Science,* (4th ed.). New York: Macmillan Publishing Co., 1992.
- Thedford, Thomas R. *Sheep Health Handbook: A Field Guide for Producers with Limited Veterinary Services.* Winrock International Informational Services Publication in collaboration with Agricultural Experiment Station, Division of Agriculture, University of Arkansas, 1990.
- Thedford, T. R. *Vaccines – Their Use, Handling, and Care.* OSU Fact Sheet No. 9100. Stillwater, OK: Cooperative Extension Service, Division of Agriculture, Oklahoma State University, n.d.

ASSIGNMENT SHEETS

OBJECTIVE 5

Assignment Sheet 1

Part 1

1. Famphur, pour-on cattle insecticide
2. 13.2%
3. no
4. 35 days
5. Pitman-Moore, Inc., Mundelein, IL
6. June and July
7. one
8. 2 oz
9. call a doctor and read the "Note to Physician" section or say that she swallowed a product that can cause cholinesterase inhibition and that the label says atropine is antidotal
10. 1/2 gallon water, 1/4 cup of detergent, and 1/4 pound of lye; the cleaning solution should be buried
11. excessive salivation, stiffness of limbs, and bloat
12. atropine

Part 2

1. 10.0%
2. 9.5 grams
3. Store in a cool place away from direct sunlight.

4. horn flies, face flies, Gulf Coast ticks, spinose earticks

5. 90.0%

6. yes

7. Fearing Manufacturing Company Inc., St. Paul, Minnesota

8. Dispose of the container in a sanitary landfill or burn it.

9. Wash hands with soap and water, avoid contamination of feed and foodstuffs.

10. none

Part 3

1. Answers will vary, but should include the following ideas:

   dermatosis (plural is dermatoses) – disease of the skin

   entomology/entomologist – the study of insects; a person who specializes in entomology

   epidemiology – science that deals with the spread and control of diseases in a population

   knurled – having small ridges or beads on a metal surface that aid in gripping

   withers – the ridges between the shoulder bones

2. cattle

   Ivermectin has been associated with adverse reactions in sensitive dogs.

3. gastrointestinal roundworms, lungworms, cattle grubs, mites, horn flies, and lice

4. 1 ml for each 22 lbs of body weight

5. 26 ml

6. along the topline in a narrow strip extending from the withers to the tailhead

7. flukes and tapeworms because they don't have GABA

8. 48 days

9. no

10. a long-sleeved shirt and rubber gloves

11. Do not permit cattle to enter water for at least six hours after treatment. Do not pour product into water. Properly dispose of the container in a landfill or by incineration.

12. Answer must include all of the following, in any order:

    - wet hair or hide
    - excessive heat and light
    - dirt (caked mud or manure)

OBJECTIVE 9

Assignment Sheet 2

1. 6 ml

2. a. 13.6 ml

   b. two

3. a. 2 ml

   b. 1 ml

   c. 3 days

Part 2

1. 8 quarts; 256 fl oz

2. 2.56 fl oz

3. 256 fl oz; 8 qts

Part 3

1. 120 cc

2. 16 cc

3. 20 cc

4. 0 cc

5. a. 1 six-pint container and 5 one-pint containers

   b. buy two six-pint containers

OBJECTIVE 30

Assignment Sheet 3

Oral report should be evaluated according to the instructor's guidelines. Give students very clear guidelines about what you expect for performance quality. You may want to use all or part of the Speech Evaluation Sheet in Unit A-2 or an evaluation form from FFA or 4-H speech projects.

The student must do all of the following:

- Identify the subject.
- Identify the source – manufacturer, researchers, university or laboratory where the product was developed.
- Describe its use or application.
- Discuss the advantages and disadvantages if appropriate.
- Tell where and how other people can obtain it.
- Use a picture if available.

WRITTEN TEST

OBJECTIVE 1

1.	C	6.	A	11.	B
2.	D	7.	B	12.	D
3.	C	8.	A	13.	A
4.	B	9.	A	14.	B
5.	D	10.	D	15.	B

OBJECTIVE 2

1, 2, 4, 6, 8, 9, 11, 12, 13, 16, 18, 19, 20, 23, 24, 25, 27, 29, 30

OBJECTIVE 3

1.	A	6.	B	11.	C
2.	C	7.	A	12.	A
3.	B	8.	D	13.	C
4.	D	9.	A	14.	A
5.	A	10.	D	15.	D

OBJECTIVE 4

2, 3, 5, 7, 8, 10, 11, 12

OBJECTIVE 5

Evaluated on Assignment Sheet 1.

OBJECTIVE 6

1. reputable
2. effectiveness
3. precautionary
4. dosage levels
5. protective
6. temperature
7. diagnosis
8. sanitation
9. animals
10. expiration date
11. recap
12. according to directions on the label

OBJECTIVE 7

1. Anaphylactic shock is a reaction that may occur when an animal is repeatedly injected with a specific drug (foreign protein) or a drug similar to one previously administered.

2. a systemic reaction (anaphylactic shock) or a local reaction (break out in hives, develop hay fever or asthma)

3. because of the increased use of vaccines and injectable pharmaceuticals

4. A fixed antibody is attached to the tissue cells. When the animal receives another dose of the same or similar protein, the fixed antibody reacts to it, damaging the tissues.

   The body releases histamine when the tissues are damaged. Histamine causes the muscles to relax, especially in the walls of the blood vessels. Blood pressure and blood flow decrease, causing symptoms of local or systemic anaphylaxis.

5. Answer must include any five of the following, in any order:
   - glassy eyes
   - grinding of the teeth
   - muscular tremors or shivering
   - rapid breathing
   - staggering gait
   - collapse followed by death
6. within minutes or not for several hours
7. an injection of epinephrine solution

OBJECTIVE 8

2, 5, 7, 8, 10

OBJECTIVE 9

Evaluated on Assignment Sheet 2.

OBJECTIVE 10

1.	E	6.	K	11.	N
2.	P	7.	L	12.	C
3.	R	8.	A		
4.	M	9.	J		
5.	Q	10.	F		

OBJECTIVE 11

1.	E	6.	J
2.	K	7.	F
3.	C		
4.	G		
5.	A		

OBJECTIVE 12

Evaluated on Job Sheet 1.

OBJECTIVE 13 **Evaluated on Job Sheet 2.**

OBJECTIVE 14 **Evaluated on Job Sheet 3.**

OBJECTIVE 15 **Evaluated on Job Sheet 4.**

OBJECTIVE 16 3, 8, 9, 10, 11, 13, 14, 16, 17, 20, 21, 22, 26, 29

OBJECTIVE 17

1. tip or hub
2. barrel case
3. palm rest
4. dosage nut
5. barrel
6. packing
7. plunger shaft

OBJECTIVE 18

1. Answer must include the following points, in this order:
   - Dismantle the syringe and boil for 10 minutes.
   - Let it cool completely.
   - Lubricate the packing with glycerin.
   - Reassemble carefully.
2. Fill the syringe with a 70% solution of ethyl alcohol and squirt out the contents. Repeat several times.
3. as little as possible
4. when they get dull or develop a burr

OBJECTIVE 19

1. I
2. K
3. F
4. G
5. I
6. H
7. C
8. A

OBJECTIVE 20

1. E
2. F
3. A and B
4. B
5. C
6. D
7. A
8. A
9. G

OBJECTIVE 21

Evaluated on Job Sheet 5.

OBJECTIVE 22

Evaluated on Job Sheet 6.

OBJECTIVE 23

Evaluated on Job Sheet 7.

OBJECTIVE 24

1. Growth hormones regulate body processes, metabolism, and the growth and size of an animal.
2. The animal would be small.
3. Discussion must include the following points, in any order:
   - **Advantages of using growth hormones**
     - increase growth rate
     - decrease feedlot cost
     - improve feed efficiency
     - animals are ready for market sooner
   - **Disadvantages of using growth hormones**
     - may affect carcass quality
     - require withdrawal period prior to slaughter

- may cause bullers or riders or prolapse of female reproductive organs

OBJECTIVE 25

2, 4, 5, 8, 9, 11, 12, 15, 16

OBJECTIVE 26

- **Methods of administering growth hormones:** 1, 4, 5, 7
- **Causes of improper implants:** 3, 5, 6, 7, 8

OBJECTIVE 27

1.	C	6.	C	11.	D	16.	D
2.	B	7.	A	12.	C		
3.	C	8.	B	13.	D		
4.	A	9.	C	14.	D		
5.	A	10.	D	15.	A		

OBJECTIVE 28

Answer may include any five of the following, in any order:

- Feed young bulls instead of steers.
- Take advantage of genetic improvements.
- Improve the quality of rations.
- Improve the digestibility and palatability of feed.
- Control parasites and disease.
- Keep informed about new developments.

OBJECTIVE 29

Evaluated on Job Sheet 8.

OBJECTIVE 30

Evaluated on Assignment Sheet 3.

CIMC
TEST CODE SHEET

VOCATIONAL PROGRAM (BOOK TITLE) ANIMAL SCIENCE

UNIT NUMBER AND TITLE C-4 – VACCINATION AND DRUGS

TOTAL NUMBER OF TEST QUESTIONS 240

TOTAL NUMBER OF BASIC SKILL QUESTIONS 221

OBJECTIVE NUMBER	TEST QUESTION NUMBER(S)	BASIC SKILL CODE(S)
1	1, 11, 12, 13, 14	U
1	2-10, 15	S
2	1-30	S
3	1-15	S
4	1-15	U
5	Evaluated on Assignment Sheet 1	
6	1-12	X
7	1-7	W, S
8	1-10	S
9	Evaluated on Assignment Sheet 2	
10	1-12	S
11	1-7	S
12	Evaluated on Job Sheet 1	
13	Evaluated on Job Sheet 2	
14	Evaluated on Job Sheet 3	
15	Evaluated on Job Sheet 4	
16	1-30	S

CIMC
TEST CODE SHEET

VOCATIONAL PROGRAM (BOOK TITLE) ANIMAL SCIENCE

UNIT NUMBER AND TITLE C-4 – VACCINATION AND DRUGS

OBJECTIVE NUMBER	TEST QUESTION NUMBER(S)	BASIC SKILL CODE(S)
17	1-7	X
18	1-4	W, S
19	1-8	S
20	1-9	S
21	Evaluated on Job Sheet 5	
22	Evaluated on Job Sheet 6	
23	Evaluated on Job Sheet 7	
24	1-3	W, S
25	1-18	S, U
26	Methods 1-7, Causes 1-10	S
27	1-16	S
28	1-5	S
29	Evaluated on Job Sheet 8	
30	Evaluated on Assignment Sheet 3	

Required Activities and Resources (R)

These are fully integrated components of this CIMC curriculum. They are usually packaged in or with the curriculum and are essential in meeting the learning objectives. To individualize this unit, use the LAP Sheet supplied in your resources.

- Reproducible Handouts and Transparency Masters are included in the Instructor's Resource Package. Handouts should be copied for all students. Transparency Masters should be used to make overhead transparencies for use during instruction. A small copy of each Transparency Master appears in the student's Information Sheets.
- Non-reproducible resources are included in the student's curriculum.

Optional Activities and Resources (O)

These are suggested high-interest activities to help deliver learning objectives to students or to let students achieve objectives in an applied context. Select as many as you wish to use. Some activities use extra resources for further information about unit content. You can make them available in the classroom for in-depth study or optional activities, but their use is not required for meeting CIMC unit objectives.

FOCUS ASSIGNMENTS

Prereading

- Have students read the Handout on castration.

Writing

- Have students write a short essay (one paragraph to one page) summarizing the main ideas in the Handout.

GENERAL INSTRUCTIONS

Assignment Sheets

R Review the directions and any specific guidelines.

R Make certain that any needed materials from the Instructor's Resource Package are available.

- [R] Have the students complete the Assignment Sheet. Evaluate each student's performance and provide reteaching and retesting as necessary. Have the students repeat the Assignment Sheet until they achieve mastery.
- [R] Complete each student's Competency Profile.
- [O] Have the students volunteer to read aloud the directions and any special guidelines.
- [O] Return the completed Assignment Sheets to the students so that they may use them for later reference if needed.

Job Sheets

- [R] Review the introduction and evaluation criteria for the Job Sheet. Remind the students that they should not fill in the blanks in the Yes/No columns.
- [R] Review and explain all general guidelines, safety cautions, and warnings.
- [R] Make sure that all tools, equipment, and supplies are available.
- [R] Demonstrate each of the procedures outlined in the Job Sheet.
- [R] Allow the students to practice the Job Sheet skills before skills testing. Coach, correct, and supervise as necessary.
- [R] Have the students complete the Job Sheet. Evaluate each student's performance and provide remediation as necessary. Have the students repeat the Job Sheet until they achieve mastery.
- [R] Complete each student's Competency Profile.
- [R] Return the completed Job Sheets to the students so that they may use them for later reference if needed.
- [O] Have the students volunteer to read aloud the job guidelines, cautions, and warnings.

LAP Sheets

The LAP Sheets are an optional component that can be used to individualize instruction. The following instructions should be followed only if you are using the LAP Sheets.

R Explain the specific procedures to be followed to the students before they begin using the LAP Sheet. Be sure that each student understands the procedures for using the LAP Sheet.

R If you want the student to complete any of the assignments on the LAP Sheet that are labeled optional, assign these to the student. Be sure to provide any needed resources.

OBJECTIVE 1

Choose the word or phrase to complete statements about dehorning.

R Discuss the importance of choosing the proper time and the proper method for dehorning.

O Show the pertinent section on dehorning in the videotape, *Management Practices for Beef Cattle I.*

OBJECTIVE 2

State precautions for dehorning.

R Discuss the dangers of dehorning and the safety practices that can reduce or prevent injury.

OBJECTIVE 3

Identify types of dehorners.

R Show students the tools covered in the objective and additional tools or supplies you want to cover. Allow students to handle the tools.

- hot iron
- spoon
- tube
- elastrator
- Barnes dehorner
- saw
- Keystone dehorner
- chemical dehorner (caustic stick, paste, or liquid)

R Combine objectives 3 and 4, discussing each tool and its use.

OBJECTIVE 4

Match mechanical dehorning tools to their descriptions.

R Discuss advantages and disadvantages of each method.

O Share personal experiences with these methods.

O Invite a stock manager or veterinarian to discuss dehorning.

OBJECTIVE 5

List factors that determine the appropriate method of dehorning.

R Discuss how the age of the animal, size of horns, equipment and labor affect the choice of dehorning method.

OBJECTIVE 6

Select from a list ways to stop bleeding after dehorning.

R Use props to demonstrate; use clear and vivid descriptions that can help students understand how to stop bleeding.

OBJECTIVE 7

Dehorn cattle using the Keystone or Barnes dehorner. (Job Sheet 1)

R See the general instructions for all Job Sheets.

R Review methods of restraining cattle from Unit C-1, "Animal Health Care."

OBJECTIVE 8

Dehorn cattle with a hot iron. (Job Sheet 2)

R See the general instructions for all Job Sheets.

OBJECTIVE 9

Choose the word or phrase to complete statements about docking.

O Show the portion of the videotape *Sheep Management Practices I* that covers docking procedures.

OBJECTIVE 10

State precautions for docking.

R Discuss the precautions and the consequences of failing to follow them.

OBJECTIVE 11

Identify tools used in docking.

R Provide the tools listed in the objective. Allow students to handle them.

- chisel
- emasculator
- elastrator
- pincher
- Burdizzo
- knife

R Teach objectives 11 and 12 together, discussing each tool and its use.

OBJECTIVE 12 **Match docking tools to their descriptions.**

R Discuss the advantages and disadvantages of each method; demonstrate its use, if possible.

O Invite a livestock manager or veterinarian to discuss docking.

OBJECTIVE 13 **Dock lambs using the elastrator. (Job Sheet 3)**

R See the general instructions for all Job Sheets.

R Review methods of restraining lambs from Unit C-1, "Animal Health Care."

R Review injection sites and types of injections prior to doing the Job Sheet.

OBJECTIVE 14 **Dock lambs using the Burdizzo. (Job Sheet 4)**

R See the general instructions for all Job Sheets.

OBJECTIVE 15 **Choose the word or phrase to complete statements about castration.**

R Discuss the differences in castrating younger and older animals.

O Show a video about castration from the pertinent sections of the following videotapes, or from another video:

- *Management Practices for Beef Cattle II*
- *Sheep Management Practices II*
- *Swine Management Practices II*

OBJECTIVE 16 **State precautions and safety factors for castration.**

R Discuss the consequences that can occur if these precautions and safety factors are not followed.

O Demonstrate and compare the pressure and control required to use a sharp knife and dull knife.

OBJECTIVE 17 **Identify castration tools.**

R Show tools to the students. Allow students to handle them.

- knife
- single-edge razor blade
- Burdizzo
- elastrator
- emasculator
- scalpel

R Teach objectives 17 and 18 together.

OBJECTIVE 18 **Choose the word or phrase to complete statements about castration methods.**

R Use props to demonstrate the castration methods.

R Discuss the advantages of each method.

O Share personal experiences castrating cattle, sheep, and swine.

OBJECTIVE 19 **State proper times and methods of castration for cattle, swine, and sheep.**

O Invite a livestock manager or veterinarian to discuss castration.

OBJECTIVE 20 **Castrate cattle using the knife method. (Job Sheet 5)**

R See the general instructions for all Job Sheets.

R Review the appropriate methods of restraining cattle.

R Review injection sites and types of injection before starting the Job Sheet.

OBJECTIVE 21 **Castrate swine using the knife method. (Job Sheet 6)**

R Review the appropriate methods of restraining pigs.

R See the general instructions for all Job Sheets.

OBJECTIVE 22 **Castrate sheep using the elastrator method. (Job Sheet 7)**

R Review the appropriate methods of restraining sheep.

R See the general instructions for all Job Sheets.

OBJECTIVE 23

Discuss poultry debeaking, caponizing, wing treatments, and other production practices.

- [O] Demonstrate or invite a poultry processor to demonstrate the techniques of debeaking, wing treatments, and caponizing.

EVALUATION

Pretest

- Use the unit Written Test for *both* the pretest and posttest. Give the students the pretest before they begin the unit.
- You may wish to use the CIMC publication *Measuring Learning and Competency Gains: The Pretest/Posttest Approach* for instructions and suggestions on giving pretests and using the results. Information for ordering this material is included in the optional resources section.
- Use pretest results to guide individual students in progressing through the unit, doing enrichment work, or moving to the next unit.

Focus Assignment

- Use an informal evaluation of the focus assignments as a diagnostic tool for determining if any students need extra help in reading comprehension or writing skills. Refer these students to their English instructor, Learning Resource Center, or Educational Enhancement Center.

Assignment Sheet

- Evaluate students on Assignment Sheet activities. Students must repeat an Assignment Sheet until they have mastered the activity.
- Complete each student's Competency Profile.

Skill Test

- Explain to the students that they will be asked to demonstrate the procedures on the Job Sheets as a skills test.
- Describe the rating scale used on the skills test.
- Reteach and retest as necessary.
- Complete each student's Competency Profile.

Posttest

- After they have completed the unit, give students the Written Test again.
- Explain to the students that they will be asked to demonstrate on the Written Test actions listed in the specific objectives.
- You may wish to use the CIMC publication *Measuring Learning and Competency Gains: The Pretest/Posttest Approach* for instructions and suggestions on giving posttests and using the results. Information for ordering this material is included in the optional resources section.
- Reteach and retest as necessary to meet individual student needs and state standards for student learning and competency gains.
- Complete the appropriate sections of the Competency Profiles.
- Review individual and group performance to evaluate teaching effectiveness. Adjust scope, sequence, or instructional methods for additional lessons as required.

OPTIONAL RESOURCES

Publications

- Ensminger, M.E. *The Stockman's Handbook*, (7th ed.). Danville, IL: Interstate Publishers, Inc., 1992.
- *Measuring Learning and Competency Gains: The Pretest/Posttest Approach*. Stillwater, OK: CIMC, Oklahoma Department of Vocational and Technical Education, 1992. For ordering information call 800-522-5810.
- *NASCO Agricultural Sciences Catalog*. Nasco-Fort Atkinson, 901 Janesville Ave., P.O. Box 901, Fort Atkinson, WI 53538-0901; 800-558-9595, FAX 414-563-8296.
  - pictures of dehorning, docking, and castration tools
  - *Animal Health*
  - *Keeping Livestock Healthy – A Veterinary Guide*

Videos

- Relevant portions of the following videotapes. Creative Educational Video, P.O. Box 65265, Lubbock, TX 79424-5265, 800-922-9965.
  - *Management Practices for Beef Cattle I* (dehorning)
  - *Management Practices for Beef Cattle II* (castration)
  - *Sheep Management Practices II* (docking and castration)
  - *Swine Management Practices II* (castration)

UNIT REFERENCES

Publications

- Barrick, R. Kirby and Hobart L. Harmon. *Animal Production and Management*. New York: Gregg Division, McGraw-Hill Book Company, 1988.
- Cullen, Patrick T. *Farm Animal Health a Practical Guide*. Great Britain: Pergamon Press, 1991.
- Ensminger, M.E. *The Stockman's Handbook*, (7th ed.). Danville, IL: Interstate Publishers, Inc., 1992.
- Gillespie, James R. *Modern Livestock & Poultry Production*, (4th ed.). Albany, NY: Delmar Publishers Inc., 1992.
- Herren, Ray V. and Roy L. Donahue. *The Agriculture Dictionary*. Albany, NY: Delmar Publishers, Inc., 1991.
- Moody, E. Grant. *Raising Small Animals*. Ezra Taft Benson Agriculture and Food Institute, Ipswich, United Kingdom: Farming Press Books, 1991.
- Pierce, Greg. *Agricultural Livestock Skills*. Stillwater, OK: Curriculum and Instructional Materials Center, Oklahoma Department of Vocational and Technical Education, 1979.
- Stamm, G. W. *Veterinary Guide for Farmers*. New York: The Hearst Corporation, 1975.
- Thedford, Thomas R. *Sheep Health Handbook: A Field Guide for Producers with Limited Veterinary Services*. Winrock International Informational Services Publication in collaboration with Agricultural Experiment Station, Division of Agriculture, University of Arkansas, 1990.

ANSWERS

DEHORNING, DOCKING, AND CASTRATION

C-5

WRITTEN TEST

OBJECTIVE 1

1. C
2. A
3. B
4. D
5. A
6. D
7. A
8. B

OBJECTIVE 2

Answer must include all of the following:

- Disinfect equipment before and after each use to prevent infection and disease.
- Perform the operation carefully to prevent scurs/regrowth.
- Dehorn cattle as young as possible.
- Dehorn cattle in early spring or late fall to reduce insect trouble.

OBJECTIVE 3

Answers must agree with the order in which the tools were presented.

- hot iron
- spoon
- tube
- elastrator
- Barnes dehorner
- saw
- Keystone dehorner
- caustic stick, paste or liquid

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
_____
_____

OBJECTIVE 4

1.	A, D, G	6.	B	11.	B
2.	B, C	7.	A	12.	D
3.	F	8.	E	13.	B
4.	C	9.	D, G	14.	A
5.	E, F	10.	C		

OBJECTIVE 5

Answers must include all of the following:

- age of the animal
- size of the horns
- available equipment
- available labor

OBJECTIVE 6

3, 4, 6, 7, 8

OBJECTIVE 7

Evaluated on Job Sheet 1.

OBJECTIVE 8

Evaluated on Job Sheet 2.

OBJECTIVE 9

1. C
2. D
3. B
4. A
5. C

OBJECTIVE 10

1. Prevent infection.
   - Use good disinfectant at docking.
   - Give a tetanus vaccination.
2. Prevent parasites.
   - Dock lamb in early spring or late fall.
   - Use wound dressing.

3. Control blood loss.

   - Use blood stopper for excessive bleeding.
   - Select a bloodless method of docking.
   - Dock lambs between three and ten days old.

4. Use good sanitation practices.

   - Clean and disinfect the whole area surrounding the cut before and after docking.
   - Clean and disinfect all instruments after each use.
   - Clean and disinfect your hands before handling the next lamb.

5. Prevent prolapse of the rectum.

   - Do not dock too high

OBJECTIVE 11

Answers must agree with the order in which the tools were presented.

- chisel
- emasculator
- elastrator
- pincher
- Burdizzo
- knife

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

_____

_____

OBJECTIVE 12

1. A
2. B
3. E
4. C
5. A, C
6. B
7. B
8. C
9. D
10. B
11. C

OBJECTIVE 13

Evaluated on Job Sheet 3.

OBJECTIVE 14

Evaluated on Job Sheet 4.

OBJECTIVE 15

1. B
2. C
3. C
4. A
5. A
6. C

OBJECTIVE 16

Answers must include all of the following:

1. Prevent infection.
   - Use good sanitation techniques, as for docking.
   - Inject antibiotics and antitoxins.
   - Watch for signs of abnormal scrotum, such as rupture or cryptorchid.
2. Prevent parasites (screwworms and maggots).
   - Castrate at a time of year when the insect population is low.
   - Use a wound dressing.

3. Control stress.

   - Castrate during mild weather.
   - Castrate only healthy animals.
   - Be aware of nervous conditions such as a pig with a quivering tail or ear.
   - Do not excite animals; remain calm.

4. Use restraints.

   - headgate
   - calf cradle
   - ropes
   - manual restraints appropriate for the type and age of the animal

5. Observe safety factors.

   - Handle and restrain animals with care to prevent injury to the animal or anyone present.
   - Use the proper facilities and equipment when working livestock.
   - Stay back out of the way to avoid being stepped on or kicked.
   - Use a sharp knife that won't close and is easy to handle.

OBJECTIVE 17

Answers must agree with the order in which the tools were presented.

- knife
- single-edged razor blade
- scalpel
- emasculator
- Burdizzo
- elastrator

1. _____
2. _____
3. _____

4. _____

5. _____

6. _____

_____

_____

OBJECTIVE 18

1.	C	6.	A	11.	C
2.	D	7.	B	12.	C
3.	B	8.	A		
4.	A	9.	A		
5.	C	10.	C		

OBJECTIVE 19

1. 7-14 days
2. early enough for the incision to heal before weaning
3. injectable chemical
4. Answer may include any three of the following, in any order:
   - slit the scrotum down the sides (lateral incision)
   - remove the lower end of the scrotum (end-cut incision)
   - Burdizzo
5. remove the lower end of the scrotum

OBJECTIVE 20

Evaluated on Job Sheet 5.

OBJECTIVE 21

Evaluated on Job Sheet 6.

OBJECTIVE 22

Evaluated on Job Sheet 7.

OBJECTIVE 23

1. to prevent cannibalism
2. one day, 12-16 weeks
3. a sharp knife, toenail clippers, or tin snips
4. Remove 1/2 to 2/3 of the upper beak and the top of the lower beak.
5. Sear the tip of the beak with a red-hot iron.
6. Answer may include any two of the following:
   - have a faster weight gain
   - do not develop male characteristics
   - have a smoother skin and flesh than intact males
   - do not fight
   - have a docile temperament
7. three to five weeks of age
8. between the last two ribs on one side or both sides
9. 2-20 days old
10. Bend the wing back at the last joint. Cauterize the break with a hot iron or debeaking machine.
11. five to six weeks old
12. Answer may include any two of the following:
    - stops large combs from interfering with eating and drinking
    - reduces injury to combs from cages and equipment
    - reduces fighting by putting hens on equal social status
13. Withhold water for 12 hours; feed vitamin K to promote clotting.
14. one day old
15. close to the skull

CIMC
TEST CODE SHEET

VOCATIONAL PROGRAM (BOOK TITLE) ANIMAL SCIENCE

UNIT NUMBER AND TITLE C-5 – DEHORNING, DOCKING, AND CASTRATION

TOTAL NUMBER OF TEST QUESTIONS 113

TOTAL NUMBER OF BASIC SKILL QUESTIONS 31

OBJECTIVE NUMBER	TEST QUESTION NUMBER(S)	BASIC SKILL CODE(S)
1	1-4, 6-8	X
1	5	S
2	1	X
3	1-8	X
4	1-14	X
5	1	X
6	1-10	S
7	Evaluated on Job Sheet 1	
8	Evaluated on Job Sheet 2	
9	1, 3-5	X
9	2	S
10	1-5	W, S
11	1-6	X
12	1-11	X
13	Evaluated on Job Sheet 3	
14	Evaluated on Job Sheet 4	
15	1-4	X
15	5, 6	S

CIMC
TEST CODE SHEET

VOCATIONAL PROGRAM (BOOK TITLE) ANIMAL SCIENCE

UNIT NUMBER AND TITLE C-5 – DEHORNING, DOCKING, AND CASTRATION

OBJECTIVE NUMBER	TEST QUESTION NUMBER(S)	BASIC SKILL CODE(S)
16	1-3	W, S
16	4, 5	W
17	1-6	X
18	1, 2, 3, 6, 10	X
18	4, 5, 7-9, 11, 12	S
19	1-5	X
20	Evaluated on Job Sheet 5	
21	Evaluated on Job Sheet 6	
22	Evaluated on Job Sheet 7	
23	1-15	X

Required Activities and Resources (R)

These are fully integrated components of this CIMC curriculum. They are usually packaged in or with the curriculum and are essential in meeting the learning objectives. To individualize this unit, use the LAP Sheet supplied in your resources.

- Reproducible handouts and Transparency Masters are included in the Instructor's Resource Package. Handouts should be copied for all students. Transparency Masters should be used to make overhead transparencies for use during instruction. A small copy of each Transparency Master appears in the student's Information Sheets.
- Non-reproducible resources are included in the student's curriculum.

Optional Activities and Resources (O)

These are suggested high-interest activities to help deliver learning objectives to students or to let students achieve objectives in an applied context. Select as many as you wish to use. Some activities use extra resources for further information about unit content. You can make them available in the classroom for in-depth study or optional activities, but their use is not required for meeting CIMC unit objectives.

FOCUS ASSIGNMENTS

Prereading

R Have students read the first page and the text in Figure 1 of *Livestock Branding in Oklahoma* by T.D. Rich and Ellis Freeny, OSU Extension Facts No. 3255.

Writing

R Have students draw their own brands, then write a short essay (a paragraph to a page) discussing why they chose that design.

GENERAL INSTRUCTIONS

Assignment Sheets

R Review the directions and any specific guidelines.

- R Make certain that any needed materials from the Instructor's Resource Package are available.
- R Have the students complete the Assignment Sheet. Evaluate each student's performance and provide reteaching and retesting as necessary. Have the students repeat the Assignment Sheet until they achieve mastery.
- R Complete each student's Competency Profile.
- O Have the students volunteer to read aloud the directions and any special guidelines.
- O Return the completed Assignment Sheets to the students so that they may use them for later reference if needed.

Job Sheets

- R Review the introduction and evaluation criteria for the Job Sheet. Remind the students that they should not fill in the blanks in the Yes/No columns.
- R Review and explain all general guidelines, safety cautions, and warnings.
- R Make sure that all tools, equipment, and supplies are available.
- R Demonstrate each of the procedures outlined in the Job Sheet.
- R Allow the students to practice the Job Sheet skills before skills testing. Coach, correct, and supervise as necessary.
- R Have the students complete the Job Sheet. Evaluate each student's performance and provide remediation as necessary. Have the students repeat the Job Sheet until they achieve mastery.
- R Complete each student's Competency Profile.
- R Return the completed Job Sheets to the students so that they may use them for later reference if needed.
- O Have the students volunteer to read aloud the job guidelines, cautions, and warnings.

LAP Sheets

The LAP Sheets are an optional component that can be used to individualize instruction. The following instructions should be followed only if you are using the LAP Sheets.

R Explain the specific procedures to be followed to the students before they begin using the LAP Sheet. Be sure that each student understands the procedures for using the LAP Sheet.

R If you want the student to complete any of the assignments on the LAP Sheet that are labeled optional, assign these to the student. Be sure to provide any needed resources.

OBJECTIVE 1

Choose the word or phrase to complete statements about hoof trimming.

O Show the pertinent section in the videotape *Sheep Management Practices II*, or another video on hoof care.

OBJECTIVE 2

State precautions for safety considerations for hoof trimming.

R Discuss the dangers of hoof trimming and the safety practices that can reduce or prevent injury.

OBJECTIVE 3

Identify hoof trimming tools.

R Show students hoof trimming tools covered in the objective and additional tools or supplies you want to cover. Allow students to handle the tools.

- electric grinder
- hoof rasp
- hoof knife
- hoof nippers
- chisel
- hoof trimmer

R Teach objectives 3 and 4 together, discussing each tool and its use.

OBJECTIVE 4 — **Match hoof trimming tools to their uses.**

- R Discuss each tool and each method, including advantages and disadvantages.
- O Share personal experiences with these methods.
- O Invite a stock manager or veterinarian to discuss hoof trimming and care.

OBJECTIVE 5 — **Select trimming procedures according to the animal's structural factors.**

- O Visit a production operation to look at structural factors.

OBJECTIVE 6 — **Trim a calf's hooves using hoof nippers and electric grinder. (Job Sheet 1)**

- R See the general instructions for all Job Sheets.

OBJECTIVE 7 — **Choose the word or phrase to complete statements about shearing.**

- O Show the portion of the video tape *Sheep Management Practices II*, or other video, covering shearing tools and methods.
- O Photocopy and distribute the Handout on grading.
- O Invite a stock manager to demonstrate shearing techniques and methods.
- O Show *Krehbiel Shearing Equipment*, a film about sheep shearing and wool baling machines.
- O Show *Steward by Oster, 1987 Sheep Shearing* or other video on shearing.

OBJECTIVE 8 — **State good shearing practices.**

- R Discuss safety practices during shearing.
- O Teach objectives 8 and 9 together, discussing the importance of properly-maintained equipment.
- O Use *Sheep Shearing Instructions* that came with your clippers to introduce students to shearing patterns they will use in Job Sheet 2.

OBJECTIVE 9 **State practices for maintaining shearing equipment.**

O Demonstrate lubricating shearing equipment.

O Display a variety of blade types and sizes and discuss the benefits and problems associated with each.

O Show *1986 Steward Sheep Shearing Equipment Maintenance* or other video on maintaining equipment.

OBJECTIVE 10 **Shear a lamb. (Job Sheet 2)**

R See the general instructions for all Job Sheets.

OBJECTIVE 11 **Choose the word or phrase to complete statements about animal identification.**

R Discuss the benefits and problems associated with each identification method.

OBJECTIVE 12 **Identify basic tools used in livestock identification.**

R Show students the tools covered in the objective and additional tools or supplies you want to cover. Allow students to handle the tools.

- electric branding iron
- tattooing pliers
- tagging pliers
- ear notching pliers
- knife
- hot iron
- hot iron heater

OBJECTIVE 13 **Complete a chart on methods of identification for cattle, swine, and sheep.**

O Review restraint methods used for each species.

OBJECTIVE 14 **Label common earmarks for cattle.**

R Use Transparency Master 1 to discuss frequently-used earmarks.

OBJECTIVE 15 **Select from a list tips for hot iron branding.**

- O Share your personal branding experiences with the students.
- O Invite a stock manager or veterinarian to discuss and demonstrate branding.
- O Show the pertinent section of *Management Practices for Beef Cattle I* or another video on handling, restraining, and branding.
- O Let students design personal brands.

OBJECTIVE 16 **Brand cattle using a hot iron. (Job Sheet 3)**

- R See the general instructions for all Job Sheets.

OBJECTIVE 17 **Tattoo a calf. (Job Sheet 4)**

- R See the general instructions for all Job Sheets.

OBJECTIVE 18 **Nose print cattle. (Job Sheet 5)**

- R See the general instructions for all Job Sheets.

OBJECTIVE 19 **State rules for ear notching pigs.**

- R Use Transparency Masters 2, 3, and 4 to discuss ear notching.
- O Discuss why tracking litter number and litter position number are important.
- O Show the pertinent section of *Swine Management Practices II* or another video on ear notching.

OBJECTIVE 20 **Interpret swine ear notches. (Assignment Sheet 1)**

- R See the general instructions for all Assignment Sheets.

OBJECTIVE 21 **Ear notch a pig. (Job Sheet 6)**

- R See the general instructions for all Job Sheets.

OBJECTIVE 22 **List guidelines for ear-tagging sheep.**

- O Discuss benefits and problems associated with each type of tag.
- O Show students the tools used for each tag type.

OBJECTIVE 23

Tag a sheep. (Job Sheet 7)

R See the general instructions for all Job Sheets.

EVALUATION

Pretest

- Use the unit Written Test for *both* the pretest and posttest. Give the students the pretest before they begin the unit.
- You may wish to use the CIMC publication *Measuring Learning and Competency Gains: The Pretest/Posttest Approach* for instructions and suggestions on giving pretests and using the results. Information for ordering this material is included in the optional resources section.
- Use pretest results to guide individual students in progressing through the unit, doing enrichment work, or moving to the next unit.

Focus Assignment

- Use an informal evaluation of the focus assignments as a diagnostic tool for determining if any students need extra help in reading comprehension or writing skills. Refer these students to their English instructor, Learning Resource Center, or Educational Enhancement Center.

Assignment Sheet

- Evaluate students on Assignment Sheet activities. Students must repeat an Assignment Sheet until they have mastered the activity.
- Complete each student's Competency Profile.

Skill Test

- Explain to the students that they will be asked to demonstrate the procedures on the Job Sheets as a skills test.
- Describe the rating scale used on the skills test.
- Reteach and retest as necessary.
- Complete each student's Competency Profile.

Posttest

- After they have completed the unit, give students the Written Test again.
- Explain to the students that they will be asked to demonstrate on the Written Test actions listed in the specific objectives.
- You may wish to use the CIMC publication *Measuring Learning and Competency Gains: The Pretest/Posttest Approach* for instructions and suggestions on giving posttests and using the results. Information for ordering this material is included in the optional resources section.
- Reteach and retest as necessary to meet individual student needs and state standards for student learning and competency gains.
- Complete the appropriate sections of the Competency Profiles.
- Review individual and group performance to evaluate teaching effectiveness. Adjust scope, sequence, or instructional methods for additional lessons as required.

REQUIRED RESOURCES

The items marked with an asterisk are included in the Instructor's Resource Package.

Publications

- Rich, T.D. and Ellis Freeny. *Livestock Branding in Oklahoma.* OSU Extension Facts No. 3255, Stillwater, OK: OSU, n.d.

OPTIONAL RESOURCES

Publications

- Application for Registration of Brand Marks and monthly publication, *The Cow Man.* Oklahoma Cattlemen's Association, Inc., Brand Registry Agent, 2500 Exchange Avenue, P.O. Box 82395, Oklahoma City, OK 73148, (405) 235-4391.
- Publications of the Cooperative Extension Service, Division of Agriculture, Oklahoma State University, Stillwater, Oklahoma (L = leaflet, F = facts):
  - L-211, *Oklahoma Ident-A-Cow Program*
  - F-3270, *Suggested Identification Methods for Cattle*

- "Shearing Preparation." in *Sheep Update*, Mar/Apr, 1989.
- *Wool Grades and the Sheep that Grow the Wool.* 4-H Members Guide, n.d.

- Ensminger, M.E. *The Stockman's Handbook*, (7th ed.). Danville, IL: Interstate Publishers, Inc., 1992.

- Gillespie, James R. *Modern Livestock & Poultry Production*, (4th ed.). Albany, NY: Delmar Publishers Inc., 1992.

- Herren, Ray V. and Roy L. Donahue. *The Agriculture Dictionary*. Albany, NY: Delmar Publishers, Inc., 1991.

- *Measuring Learning and Competency Gains: The Pretest/Posttest Approach.* Stillwater, OK: CIMC, Oklahoma Department of Vocational and Technical Education, 1992. For ordering information call 800-522-5810.

- The Mid-State Wool Growers Association, Hutchinson Kansas. Various publications and information, 800-835-9665.

- *The Merck Veterinary Manual*, (7th ed.). Rahway, NJ: Merck & Co., Inc. 1991.

- *NASCO Agricultural Sciences Catalog.* Nasco-Fort Atkinson, 901 Janesville Ave., P.O. Box 901, Fort Atkinson, WI 53538-0901; 800-558-9595, FAX 414-563-8296.
  - *Animal Health*
  - *Keeping Livestock Healthy – A Veterinary Guide*
  - Equipment and pictures equipment for hoof trimming, shearing, and identification

    ☞ **NOTE:** The catalog has good color photographs of livestock identification equipment.

- *How to Shear Sheep.* Posters available from Green Country Animal Clippers, 1513 South Utica, Tulsa, OK, 918-744-1305 or from Oster Professional Products Dept., 5155 N. Lydell Avenue, Milwaukee, WI 53217, 414-332-8300.

- *Sheep Shearing Instructions.* Milwaukee, WI: Oster Professional Products Department, 1987.

Videos

- *Krehbiel Shearing Equipment.* Hydro, OK: Hydro Hardware. For ordering information, call 405-542-6983. (VHS)

  ☛ **NOTE:** The Krehbiels (pronounced kray-bill) will perform shearing and wool spinning demonstrations.

- *Sheep Management Practices-II, Management Practices for Beef Cattle-I,* and *Swine Management Practices-II.* Lubbock, TX: Creative Educational Video, 1987. For ordering information call 800-922-9965. (VHS)

- *Stewart by Oster: 1987 Sheep Shearing* (26 min) and *1986 Stewart Sheep Shearing Equipment Maintenance* (39 min). Available from Oster Professional Products, Route 9, Box 541, McMinnville, TN 37110, 414-332-8300.

UNIT REFERENCES

Publications

- Barrick, R. Kirby and Hobart L. Harmon. *Animal Production and Management.* New York: Gregg Division, McGraw-Hill Book Company, 1988.

- Cullen, Patrick T. *Farm Animal Health: A Practical Guide.* Great Britain: Pergamon Press, 1991.

- Ensminger, M.E. *The Stockman's Handbook,* (7th ed.). Danville, IL: Interstate Publishers, Inc., 1992.

- Gillespie, James R. *Modern Livestock & Poultry Production,* (4th ed.). Albany, NY: Delmar Publishers Inc., 1992.

- Herren, Ray V. and Roy L. Donahue. *The Agriculture Dictionary.* Albany, NY: Delmar Publishers, Inc., 1991.

- Pierce, Greg. *Agricultural Livestock Skills.* Stillwater, OK: CIMC, Oklahoma Department of Vocational and Technical Education, 1979.

- Rich, T.D. and Ellis Freeny. *Livestock Branding in Oklahoma.* OSU Extension Facts No. 3255, Stillwater, OK: OSU, n.d.

- *Sheep Shearing Instructions.* Milwaukee, WI: Oster Professional Products Department, 1987.

- Stamm, G. W. *Veterinary Guide for Farmers.* New York: The Hearst Corporation, 1975.

- Thedford, Thomas R. *Sheep Health Handbook: A Field Guide for Producers with Limited Veterinary Services.* Winrock International Informational Services Publication in collaboration with Agricultural Experiment Station, Division of Agriculture, University of Arkansas, 1990.

- *Wool Grades and the Sheep that Grow the Wool.* 4-H Members Guide, Cooperative Extension Service, Division of Agriculture, Stillwater, OK: OSU, n.d.

ASSIGNMENT SHEET

OBJECTIVE 20

Assignment Sheet

1.

2.

3.

4.

5.

6.

7. a. 31-8
   b. 108-12
   c. 13-11

WRITTEN TEST

OBJECTIVE 1

1. B
2. D
3. A
4. D
5. B
6. B
7. C
8. A

OBJECTIVE 2

Answers must include the following, in any order.

- Disinfect equipment before and after each use to prevent infection and disease.
- Restrain the animal properly.
- Clean the hoof with a clean brush and clean water.
- If serious overgrowth has occurred, reshape the hooves slowly, over several sessions to prevent tenderness and lameness.
- Do not cut into the quick. Cut only until a pink coloration appears.

OBJECTIVE 3

Answers must agree with the order in which the tools were presented.

- electric grinder
- hoof rasp
- hoof knife
- hoof nippers
- chisel
- hoof trimmer

1. _____
2. _____
3. _____
4. _____

5. _____

6. _____

7. _____

8. _____

OBJECTIVE 4

1. H
2. A, E
3. F
4. G
5. B

OBJECTIVE 5

1. B
2. A
3. D
4. A
5. D
6. B
7. C
8. A
9. C

OBJECTIVE 6

Evaluated on Job Sheet 1.

OBJECTIVE 7

1. D
2. A
3. C
4. B
5. C
6. B
7. A
8. D

OBJECTIVE 8

Answer may include any eight of the following, in any order:

- Hold the sheep in a position that insures that its skin will be stretched tight on the part of the body being shorn.
- Make each stroke with the clippers as long as possible.
- Keep the ends of the teeth of the clippers on the sheep's skin throughout every stroke.
- Keep your shearing equipment in good condition.
- Work on a clean, smooth surface.
- Disinfect blades between shearing animals to prevent transmission of infectious diseases.
- Strive for thoroughness and evenness.
- Shearing should only take place when the wool is dry.
- When ewes or lambs are sheared, they must be handled carefully. Use balance, rather than force, to position the animal.

OBJECTIVE 9

Answers must include all of the following, in any order:

- Keep equipment well lubricated.
- Use clean oil; remove old or darkened oil from equipment.
- Replace bent, chipped, or broken combs and blades.
- Use the proper size and shape razor, comb, and blade.
- Clean all wool from the razor after shearing black wool.

OBJECTIVE 10

Evaluated on Job Sheet 2.

OBJECTIVE 11

1.	B	6.	A
2.	B	7.	B
3.	A	8.	D
4.	B	9.	A
5.	C	10.	C

OBJECTIVE 12

Answers must agree with the order in which the tools were presented.

- electric branding iron
- ear notching pliers
- knife
- hot iron heater
- tattooing pliers
- tagging pliers
- hot iron

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____

OBJECTIVE 13

Method	Cattle	Sheep	Swine
hot iron branding	x		
freeze branding	x		
paint branding	x	x	x
tattooing ear or lip	x	x	x
tagging	x	x	x
noseprinting	x	x	
ear notching	x	x	x
neck chains or straps	x		
horn brands	x		
electronic transmitters	x	x	x

OBJECTIVE 14

1. tipped
2. hole
3. swallow fork
4. underbit
5. overslope
6. bobbed or cropped
7. split
8. underslope
9. overbit

OBJECTIVE 15

1, 2, 4, 5, 6, 8, 10, 13, 14, 15, 17, 19, 21, 22

OBJECTIVE 16

Evaluated on Job Sheet 3.

OBJECTIVE 17

Evaluated on Job Sheet 4.

OBJECTIVE 18

Evaluated on Job Sheet 5.

OBJECTIVE 19

Answers must include all of the following, in any order.

- The litter number is placed in the pig's right ear.
- The pig number is placed in the pig's left ear.
- Pigs in the same litter will have identical notches in the right ear.
- Pigs in the same litter will have different notches in the left ear.
- The litter of the first sow to farrow is usually designated as litter number one.
- Each successive litter is assigned a number in order of farrowing.
- Use the proper size ear notcher.
- Some pure-breed associations use special numbering systems.
- Each ear is divided into four quadrants.
- The ears are "read" by adding the values of the notches.

OBJECTIVE 20

Evaluated on Assignment Sheet 1.

OBJECTIVE 21

Evaluated on Job Sheet 6.

OBJECTIVE 22

Answers should include the following, in any order:

- Tags should be inserted 2-3 days to 2-3 weeks after birth.
- Tags can be self-piercing or can require a hole be punched in the ear before insertion.
- Instruments and tags must be clean before insertion.
- Tags must be appropriate in size and shape for the age of the animal, size of the ear, and usefulness at the site.
- Insertion should be through cartilage; avoid injuring veins.

OBJECTIVE 23

Evaluated on Job Sheet 7.

CIMC
TEST CODE SHEET

VOCATIONAL PROGRAM (BOOK TITLE) ANIMAL SCIENCE

UNIT NUMBER AND TITLE C-6 – HOOF TRIMMING, SHEARING, AND ANIMAL IDENTIFICATION

TOTAL NUMBER OF TEST QUESTIONS 131

TOTAL NUMBER OF BASIC SKILL QUESTIONS 24

OBJECTIVE NUMBER	TEST QUESTION NUMBER(S)	BASIC SKILL CODE(S)
1	1-8	S
2	1-5	X
3	1-8	X
4	1-5	X
5	1-9	X
6	Evaluated on Job Sheet 1	
7	1-8	X
8	1-8	X
9	1-5	X
10	Evaluated on Job Sheet 2	
11	1-8, 10	X
11	9	R
12	1-9	X
13	1-10	X
14	1-9	X
15	1-22	X
16	Evaluated on Job Sheet 3	
17	Evaluated on Job Sheet 4	

CIMC
TEST CODE SHEET

VOCATIONAL PROGRAM (BOOK TITLE) ANIMAL SCIENCE

UNIT NUMBER AND TITLE C-6 – HOOF TRIMMING, SHEARING, AND ANIMAL IDENTIFICATION

OBJECTIVE NUMBER	TEST QUESTION NUMBER(S)	BASIC SKILL CODE(S)
18	**Evaluated on Job Sheet 5**	
19	**1-10**	**W**
20	**Evaluated on Assignment Sheet 1**	
21	**Evaluated on Job Sheet 6**	
22	**1-5**	**W**
23	**Evaluated on Job Sheet 7**	

Required Activities and Resources (R)

These are fully integrated components of this CIMC curriculum. They are usually packaged in or with the curriculum and are essential in meeting the learning objectives. To individualize this unit, use the LAP Sheet supplied in your resources.

- Reproducible Handouts and Transparency Masters are included in the Instructor's Resource Package. Handouts should be copied for all students. Transparency Masters should be used to make overhead transparencies for use during instruction. A small copy of each Transparency Master appears in the student's Information Sheets.

- Non-reproducible resources are included in the student's curriculum.

Optional Activities and Resources (O)

These are suggested high-interest activities to help deliver learning objectives to students or to let students achieve objectives in an applied context. Select as many as you wish to use. Some activities use extra resources for further information about unit content. You can make them available in the classroom for in-depth study or optional activities, but their use is not required for meeting CIMC unit objectives.

FOCUS ASSIGNMENTS

Prereading

R Have students read OSU Extension Facts No. 521 "Cattle Marketing Plan."

Writing

R Have students write a short (one paragraph) discussion on cattle marketing plans and why producers should develop a plan.

GENERAL INSTRUCTIONS

Assignment Sheets

- [R] Review the directions and any specific guidelines.
- [R] Make certain that any needed materials from the Instructor's Resource Package are available.
- [R] Have the students complete the Assignment Sheet. Evaluate each student's performance and provide reteaching and retesting as necessary. Have the students repeat the Assignment Sheet until they achieve mastery.
- [R] Complete each student's Competency Profile.
- [O] Have the students volunteer to read aloud the directions and any special guidelines.
- [O] Return the completed Assignment Sheets to the students so that they may use them for later reference if needed.

Job Sheets

- [R] Review the introduction and evaluation criteria for the Job Sheet. Remind the students that they should not fill in the blanks in the Yes/No columns.
- [R] Review and explain all general guidelines, safety cautions, and warnings.
- [R] Make sure that all tools, equipment, and supplies are available.
- [R] Demonstrate each of the procedures outlined in the Job Sheet.
- [R] Allow the students to practice the Job Sheet skills before skills testing. Coach, correct, and supervise as necessary.
- [R] Have the students complete the Job Sheet. Evaluate each student's performance and provide remediation as necessary. Have the students repeat the Job Sheet until they achieve mastery.
- [R] Complete each student's Competency Profile.
- [R] Return the completed Job Sheets to the students so that they may use them for later reference if needed.
- [O] Have the students volunteer to read aloud the job guidelines, cautions, and warnings.

LAP Sheets

The LAP Sheets are an optional component that can be used to individualize instruction. The following instructions should be followed only if you are using the LAP Sheets.

- R Explain the specific procedures to be followed to the students before they begin using the LAP Sheet. Be sure that each student understands the procedures for using the LAP Sheet.

- R If you want the student to complete any of the assignments on the LAP Sheet that are labeled optional, assign these to the student. Be sure to provide any needed resources.

OBJECTIVE 1

Choose the word or phrase to complete statements about marketing livestock.

- O Discuss the history of livestock marketing and how it has changed. Several examples would be the following: in the past cattle had to be moved by trail whereas today cattle are moved mainly by trucking; the conditions of the meatpacking industry at the turn of the century; and the increasing importance of international trade to the field of agriculture.

- O Have students write a short paper on the history and changes in livestock marketing. Students may write on one aspect such as transportation or the importance of international trade.

- O Bring trade journals such as *Meat & Poultry, Meat Industry,* or *Farm Futures* and make them available for students to read.

OBJECTIVE 2

Discuss types of marketing.

- O Discuss types of marketing. Ask students for advantages and disadvantages of each type of marketing.

- O Obtain the following OSU publications and make them available for students to read:

  - F-430 "Livestock Futures Markets"
  - F-433 "Basis: The Key To Successful Livestock Hedging"
  - F-475 "Electronic Marketing in Oklahoma: Experiences and Opportunities"
  - F-487 "Basics of Live Cattle Options Trading"
  - F-500 "Oklahoma City Minus Chicago Mercantile Exchange Stocker Steer Basis"

- F-525 "Assessing Group Marketing Alternatives for Livestock"
- E-876 "Marketing Beef in Oklahoma: A Home Study Course"

O Have students research the futures market and write a short paper on their findings. Ask several students to report their findings to the class.

OBJECTIVE 3

Analyze market information from a local livestock auction and from a terminal market. (Assignment Sheet 1)

R See the general instructions for all Assignment Sheets.

OBJECTIVE 4

Interpret livestock reports. (Assignment Sheet 2)

R See the general instructions for all Assignment Sheets.

OBJECTIVE 5

State characteristics of the Packers and Stockyards Act.

O Discuss the Packers and Stockyards Act. Explain that the Packers and Stockyards Act regulations are subject to change. For the most up-to-date regulations check with the nearest regional Packers and Stockyards Administration office. For Oklahoma contact: Packers and Stockyards Administration, Room 8A36 Federal Building, 819 Taylor St., Fort Worth, TX 76102 (817-334-3286).

OBJECTIVE 6

Select from a list types of charges and selling fees involved in livestock auctions.

O Have an individual who works with livestock auctions speak to the class.

O Have students visit a livestock auction.

OBJECTIVE 7

State factors that determine dressing percentage of cattle.

O Refer to *Meat and Poultry Processing*, Unit IV "Purchasing Livestock for Slaughter." Make this information available for students to read.

OBJECTIVE 8 **Select from a list factors which affect quality grade.**

- O Refer to *Meat and Poultry Processing*, Unit VI "Quality and Yield Grading Meat and Poultry Products." Make this information available for students to read.
- O Show the video *Beef Quality Grading.*
- O Obtain the USDA publication *USDA Slaughter Grades for Beef and Swine* and make it available for students to read.

OBJECTIVE 9 **State factors on which yield grades are based.**

- O Refer to *Meat and Poultry Processing*, Unit VI "Quality and Yield Grading Meat and Poultry Products." Make this information available for students to read.
- O Show the video *Beef Yield Grading.*

OBJECTIVE 10 **Discuss shrinkage.**

- O Refer to *Meat and Poultry Processing*, Unit IV "Purchasing Livestock for Slaughter." Make this information available for students to read.

OBJECTIVE 11 **Select from a list major causes of livestock bruises.**

- O Discuss causes of livestock bruises. Emphasize that many of these causes can be prevented if proper precautions are taken.

OBJECTIVE 12 **Calculate break-even price. (Assignment Sheet 3)**

- R See the general instructions for all Assignment Sheets.

OBJECTIVE 13 **Calculate selling prices of livestock when given the kind of livestock, number, price per hundredweight, and the shrinkage, if any. (Assignment Sheet 4)**

- R See the general instructions for all Assignment Sheets.

OBJECTIVE 14

Calculate selling prices of hogs and cattle according to yield and grade. (Assignment Sheet 5)

R See the general instructions for all Assignment Sheets.

OBJECTIVE 15

Discuss marketing of purebred cattle.

O Discuss marketing of purebred cattle. Ask students to make a list of differences in marketing purebred and crossbred cattle.

O Bring breed association magazines in to class and make them available for students to read.

O Invite a purebred breeder to speak to the class about marketing purebred cattle.

OBJECTIVE 16

Locate sources for purebred ads. (Assignment Sheet 6)

R See the general instructions for all Assignment Sheets.

OBJECTIVE 17

Design an ad. (Assignment Sheet 7)

R See the general instructions for all Assignment Sheets.

EVALUATION

Pretest

- Use the unit Written Test for *both* the pretest and posttest. Give the students the pretest before they begin the unit.
- You may wish to use the CIMC publication *Measuring Learning and Competency Gains: The Pretest/Posttest Approach* for instructions and suggestions on giving pretests and using the results. Information for ordering this material is included in the optional resources section.
- Use pretest results to guide individual students in progressing through the unit, doing enrichment work, or moving to the next unit.

Focus Assignment

- Use an informal evaluation of the focus assignments as a diagnostic tool for determining if any students need extra help in reading comprehension or writing skills. Refer these *students to their English instructor, Learning Resource* Center, or Educational Enhancement Center.

Assignment Sheet

- Evaluate students on Assignment Sheet activities. Students must repeat an Assignment Sheet until they have mastered the activity.

- Complete each student's Competency Profile.

Skill Test

- Explain to the students that they will be asked to demonstrate the procedures on the Job Sheets as a skills test.

- Describe the rating scale used on the skills test.

- Reteach and retest as necessary.

- Complete each student's Competency Profile.

Posttest

- After they have completed the unit, give students the Written Test again.

- Explain to the students that they will be asked to demonstrate on the Written Test actions listed in the specific objectives.

- You may wish to use the CIMC publication *Measuring Learning and Competency Gains: The Pretest/Posttest Approach* for instructions and suggestions on giving posttests and using the results. Information for ordering this material is included in the optional resources section.

- Reteach and retest as necessary to meet individual student needs and state standards for student learning and competency gains.

- Complete the appropriate sections of the Competency Profiles.

- Review individual and group performance to evaluate teaching effectiveness. Adjust scope, sequence, or instructional methods for additional lessons as required.

REQUIRED RESOURCES

The items marked with an asterisk are included in the Instructor's Resource Package.

Publications

- Peel, Derrell and Kim Anderson. "Cattle Marketing Plan." OSU Extension Facts No. F-521. Stillwater, OK: Oklahoma State University Cooperative Extension Service, 1992.

OPTIONAL RESOURCES

Publications

- Lesser, William. *Marketing Livestock and Meat.* New York: Food Products Press, 1993.
- *Measuring Learning and Competency Gains: The Pretest/Posttest Approach.* Stillwater, OK: CIMC, Oklahoma Department of Vocational and Technical Education, 1992. For ordering information call 800-522-5810.
- *Meat and Poultry Processing.* Stillwater, OK: CIMC, Oklahoma Department of Vocational and Technical Education, 1992.
- The following Oklahoma State University publications. Stillwater, OK: Oklahoma State University Cooperative Extension Service.
  - F-430 "Livestock Futures Markets"
  - F-433 "Basis: The Key To Successful Livestock Hedging"
  - F-475 "Electronic Marketing in Oklahoma: Experiences and Opportunities"
  - F-487 "Basics of Live Cattle Options Trading"
  - F-500 "Oklahoma City Minus Chicago Mercantile Exchange Stocker Steer Basis"
  - F-525 "Assessing Group Marketing Alternatives for Livestock"
  - E-876 "Marketing Beef in Oklahoma: A Home Study Course"

UNIT REFERENCES

Videos

- *Beef Quality Grading.* Creative Educational Videos, P.O. Box 65265, Lubbock, TX 79464. (800) 922-9965.
- *Beef Yield Grading.* Creative Educational Videos, P.O. Box 65265, Lubbock, TX 79464. (800) 922-9965.

Publications

- Anderson, Kim B. *Marketing Beef in Oklahoma: A Home Study Course.* Stillwater, OK: Oklahoma State Cooperative Extension Service, 1989.
- Barrick, R. Kirby and Hobart L. Harmon. *Animal Production and Management.* New York: McGraw-Hill, 1988.
- Ensminger, M.E. *Animal Science Digest.* Danville, IL: Interstate Publishers, Inc., 1991.
- Gillespie, James R. *Modern Livestock & Poultry Production, (4th ed.).* Delmar Publisher, Inc., 1992.
- Lesser, William. *Marketing Livestock and Meat.* New York: Food Products Press, 1993.
- *Meat and Poultry Processing.* Stillwater, OK: CIMC, Oklahoma Department of Vocational and Technical Education, 1992.
- Price, David P. *Modern Agriculture: Science, Finance, Production and Economics.* University Park, NM: SWI Publishing, 1989.

ASSIGNMENT SHEETS

OBJECTIVE 3

Assignment Sheet 1

Student answers will vary. Students should analyze market information from a local livestock auction and from a terminal market by answering each question in the Assignment Sheet.

OBJECTIVE 4

Assignment Sheet 2

Student answers will vary. Students should interpret livestock reports by answering each question in the Assignment Sheet.

OBJECTIVE 12

Assignment Sheet 3

1. $65.86/cwt
   260 x .70 = 182 lbs carcass
   182 x $.82 = $149.24 carcass value
   $149.24 + $22.00 = $171.24
   ($171.00 ÷ 260) x 100 = $65.86

2. $80.92/cwt
   1250 x .62 = 775 lbs carcass weight
   775 x $1.22 = $945.50 carcass value
   $945.50 + $66.00 = $1011.50
   ($1011.50 ÷ 1250) x 100 = $80.92

3. $97.03/cwt
   120 x .54 = 64.8 lbs carcass weight
   65 x $1.55 = $100.44 carcass value
   $100.44 + $16.00 = $116.44
   ($116.44 ÷ 120) x 100 = $97.03

4. $41.98/cwt
   240 x .72 = 172.8 lbs carcass weight
   172.8 x $.45 = $77.76 live value
   $77.76 + $23.00 = $100.76
   ($100.76 ÷ 240) x 100 = $41.98

OBJECTIVE 13

Assignment Sheet 4

1. $94.50 x 5.75 = 543.38
   543.38 x .03 = 16.3
   543.38 - 16.3 = 527.08 per steer
   527.08 x 20 = $10,541.60

2. $75.00 x 12 = 900
   900 x 7 = $6,300.00

3. $82.00 x 5.6 = 459.2
   459.2 x 5 = $2,296.00

4. It would be more profitable to sell at the local livestock auction. If sold at the terminal market, there would be a shrink of 21.28 lbs per steer.

   Terminal market

   $92.50 x 5.75 = 531.88
   531.88 x .04 = 21.28
   531.88 - 21.28 = 510.6
   510.6 x 150 = $76,590.00

   Local livestock auction

   $91.75 x 5.75 = 527.56
   527.56 x 150 = $79,134.00

OBJECTIVE 14

Assignment Sheet 5

1. 68.8% or 69%
   148 ÷ 215 = 68.8%

2. 500 x 1.15 = 575
   575 x 2 = $1,150.00

3. 400 x 1.12 = 448
   448 x 20 = $8,960.00

   $80.50 x 7.5 = 603.75
   603.75 x 20 = $12,075.00

OBJECTIVE 16

Assignment Sheet 6

Student answers will vary. Students should locate at least two sources for purebred ads.

OBJECTIVE 17

Assignment Sheet 7

Student answers will vary. Students should design an ad to promote a purebred cattle operation. Ads should follow the guidelines listed in the Assignment Sheet.

WRITTEN TEST

OBJECTIVE 1

1. B
2. C
3. A
4. D
5. B
6. D

OBJECTIVE 2

1. Livestock are sold by public bidding to the buyer who offers the highest price.

2. Answer should include any two of the following:

   - *Order buyers* buy cattle for cattle feeders and for packing plants.
   - *Cattle dealers* buy feeder cattle for cattle feeders and may also buy slaughter cattle.
   - *Contract sales* are a method of marketing cattle directly from feeder cattle producers to cattle feeders.
   - Farmers may sell *directly to packers* at packer buying stations or packing plants.
   - Local dealers or individuals may purchase animals on the farm from the producer.
   - Farmers may sell cattle *directly to the consumer.*

3. Electronic marketing involves the use of modern communications and computer technology to aid in marketing farm products.

4. Answer should include any two of the following:

   - Telephone auctions (teleauctions) are auctions conducted over a conference telephone network.

- Video auctions are auction sales where buyers view video tapes of the products for sale.

- Computerized markets use computers to disseminate information about farm products for sale; buyers have access to the descriptions through computer terminals; trading is conducted using an accepted pricing method such as auction, bids and offers, or negotiation.

- Computer-assisted markets use a computer to list products for sale but prices are not negotiated over the computer system; buyers contact the sellers directly and negotiate the sale of the product.

5. Terminal markets are livestock trading centers whose facilities are owned by a stockyard company and have commission firms (selling agents); terminal markets may use auction sales as a method of selling.

6. Futures markets can help producers market cattle by providing information and establishing a price.

7. Marketing by carcass grade and weight basis allows for the high cutout value of prime cuts and the quality to be better taken into account.

OBJECTIVE 3

Evaluated on Assignment Sheet 1.

OBJECTIVE 4

Evaluated on Assignment Sheet 2

OBJECTIVE 5

Answer should include any four of the following:

- The Packers and Stockyards Act is a federal law which is administered by the USDA.

- The Packers and Stockyards Act affects all interstate transactions in livestock – cattle, sheep, hogs, horses, mules, and goats.

- The Act sets standards for fair business practices and competition.

- The provisions of the Packers and Stockyards Act apply to stockyards, auction markets, packers, market agencies, and dealers involved in livestock marketing.

- The Act covers registration and bonding, services and rates, payment, scales and weighing, accounting, and business practices.

OBJECTIVE 6

2, 4, 5, 7, 9, 10

OBJECTIVE 7

Answer should include the following in any order:

- Fill
- Muscling
- Fat

OBJECTIVE 8

1, 2, 4, 6, 7

OBJECTIVE 9

Answer should include the following in any order:

- Carcass weight
- Area of the rib eye muscle
- Amount of external fat
- Amount of internal or kidney, heart, and pelvic fat

OBJECTIVE 10

1. Shrinkage is of concern to producers and packers because it affects the market value of the animal.
2. Answer should include any five of the following:
   - Fill
   - Handling
   - Weather
   - Distance transported
   - Species and class
   - Condition of the livestock

- Sex
- Length of the fillback period

3. A major means of minimizing shrink is to reduce the distance the livestock are transported.
4. Tissue shrinkage is the actual loss of carcass weight.

OBJECTIVE 11 1, 2, 4, 6, 8

OBJECTIVE 12 **Evaluated on Assignment Sheet 3**

OBJECTIVE 13 **Evaluated on Assignment Sheet 4**

OBJECTIVE 14 **Evaluated on Assignment Sheet 5**

OBJECTIVE 15

1. Purebred cattle are usually sold by private sales or by auction.
2. Purebred breeders may advertise in breed association magazines and other sources and by exhibiting at fairs and shows.

OBJECTIVE 16 **Evaluated on Assignment Sheet 6**

OBJECTIVE 17 **Evaluated on Assignment Sheet 7**

CIMC
TEST CODE SHEET

VOCATIONAL PROGRAM (BOOK TITLE) ANIMAL SCIENCE

UNIT NUMBER AND TITLE D-1 – MARKETING LIVESTOCK AND MARKET AGENCIES

TOTAL NUMBER OF TEST QUESTIONS 68

TOTAL NUMBER OF BASIC SKILL QUESTIONS 16

OBJECTIVE NUMBER	TEST QUESTION NUMBER(S)	BASIC SKILL CODE(S)
1	1-6	U
2	1-6	U
3	Evaluated on Assignment Sheet 1	
4	Evaluated on Assignment Sheet 2	
5	1-4	U
6	1-10	X
7	1-3	X
8	1-8	X
9	1-4	X
10	1-4	X
11	1-8	X
12	Evaluated on Assignment Sheet 3	
13	Evaluated on Assignment Sheet 4	
14	Evaluated on Assignment Sheet 5	

CIMC
TEST CODE SHEET

VOCATIONAL PROGRAM (BOOK TITLE) ANIMAL SCIENCE

UNIT NUMBER AND TITLE D-1 – MARKETING LIVESTOCK AND MARKET AGENCIES

OBJECTIVE NUMBER	TEST QUESTION NUMBER(S)	BASIC SKILL CODE(S)
15	**1-2**	**X**
16	**Evaluated on Assignment Sheet 6**	
17	**Evaluated on Assignment Sheet 7**	

Required Activities and Resources (R)

These are fully integrated components of this CIMC curriculum. They are usually packaged in or with the curriculum and are essential in meeting the learning objectives. To individualize this unit, use the LAP Sheet supplied in your resources.

- Reproducible Handouts and Transparency Masters are included in the Instructor's Resource Package. Handouts should be copied for all students. Transparency Masters should be used to make overhead transparencies for use during instruction. A small copy of each Transparency Master appears in the student's Information Sheets.

- Non-reproducible resources are included in the student's curriculum.

Optional Activities and Resources (O)

These are suggested high-interest activities to help deliver learning objectives to students or to let students achieve objectives in an applied context. Select as many as you wish to use. Some activities use extra resources for further information about unit content. You can make them available in the classroom for in-depth study or optional activities, but their use is not required for meeting CIMC unit objectives.

FOCUS ASSIGNMENTS

Prereading

Have students read *Meat Inspection and Grading*, by Frederick K. Ray, OSU Extension Facts No. 3972.

Writing

Have students write a short essay (one paragraph to one page) on the differences between meat inspection and meat grading.

GENERAL INSTRUCTIONS

Assignment Sheets

- R Review the directions and any specific guidelines.
- R Make certain that any needed materials from the Instructor's Resource Package are available.
- R Have the students complete the Assignment Sheet. Evaluate each student's performance and provide reteaching and retesting as necessary. Have the students repeat the Assignment Sheet until they achieve mastery.
- R Complete each student's Competency Profile.
- O Have the students volunteer to read aloud the directions and any special guidelines.
- O Return the completed Assignment Sheets to the students so that they may use them for later reference if needed.

Job Sheets

- R Review the introduction and evaluation criteria for the Job Sheet. Remind the students that they should not fill in the blanks in the Yes/No columns.
- R Review and explain all general guidelines, safety cautions, and warnings.
- R Make sure that all tools, equipment, and supplies are available.
- R Demonstrate each of the procedures outlined in the Job Sheet.
- R Allow the students to practice the Job Sheet skills before skills testing. Coach, correct, and supervise as necessary.
- R Have the students complete the Job Sheet. Evaluate each student's performance and provide remediation as necessary. Have the students repeat the Job Sheet until they achieve mastery.
- R Complete each student's Competency Profile.
- R Return the completed Job Sheets to the students so that they may use them for later reference if needed.
- O Have the students volunteer to read aloud the job guidelines, cautions, and warnings.

LAP Sheets

The LAP Sheets are an optional component that can be used to individualize instruction. The following instructions should be followed only if you are using the LAP Sheets.

R Explain the specific procedures to be followed to the students before they begin using the LAP Sheet. Be sure that each student understands the procedures for using the LAP Sheet.

R If you want the student to complete any of the assignments on the LAP Sheet that are labeled optional, assign these to the student. Be sure to provide any needed resources.

OBJECTIVE 1

Choose the word or phrase to complete statements about market grades and classes of livestock.

O Show *Market Cattle Evaluation, Market Swine Evaluation,* or another video on market grades and classes of livestock.

O Arrange for students to visit a stockyard and identify different market grades and classes of livestock.

OBJECTIVE 2

List factors that should be considered in selecting feeder cattle.

O Invite a stock manager to discuss factors he or she uses when selecting feeder cattle.

OBJECTIVE 3

Define approximate age ranges for cattle.

O Have students identify age categories in a herd.

OBJECTIVE 4

State indicators of yield grades.

O Use a live animal to point out the indicators of yield grades.

OBJECTIVE 5

Choose the word or phrase to complete statements about factors and standards used in the preliminary yield grade schedule for cattle.

R Review yield grade calculation.

O Show *Beef Yield Grading* or another video on yield grading.

O Invite a USDA extension agent to demonstrate how to determine yield grade.

O Arrange for students to visit a meat packing facility to determine yields and retail cuts on beef carcasses.

OBJECTIVE 6 **Calculate yield grades for cattle carcasses. (Assignment Sheet 1)**

- R See the general instructions for all Assignment Sheets.
- R Photocopy and distribute Handout 1.

OBJECTIVE 7 **Name qualifications for quality grades of cattle.**

- O Show *Beef Quality Grading, Practice Beef Quality Grading, Practice Beef Quality Grading II,* or another video on quality grading of cattle.
- O Visit a meat packing facility to examine the degrees of marbling in selected carcasses.
- O Show students color photos of marbling.

OBJECTIVE 8 **Match slaughter grades of cattle to their descriptions.**

- O Show *Slaughter Cattle Evaluation, Slaughter Cow Evaluation,* or another video on slaughter grades of cattle.

OBJECTIVE 9 **Select true statements about the qualifications for feeder grades of cattle.**

- O Show *Market Cattle Evaluation* or another video on the qualifications for feeder grades of cattle.
- O Use a live animal to demonstrate frame size and thickness specifications.

OBJECTIVE 10 **Classify live cattle according to slaughter and feeder grades. (Assignment Sheet 2)**

- R See the general instructions for all Assignment Sheets.

OBJECTIVE 11 **List factors that determine market classes of sheep.**

- O Show *Market Lamb and Breeding Sheep Evaluation, Judging Market Lambs,* or another video on determining market classes of sheep.
- O Visit a sheep ranch and observe factors that determine market classes of sheep.

OBJECTIVE 12 **Match characteristics of age groups of sheep to their descriptions.**

- O Visit a stockyard auction and compare selling prices of

different age groups of sheep.

- Have students listen to stock reports or collect them from newspapers and chart the selling prices of sheep by age group.

OBJECTIVE 13 **Name the criteria for slaughter grades of lamb.**

- Visit a meat packing facility to examine quality-indicating characteristics and cutability.

OBJECTIVE 14 **Match slaughter grades of lamb to their descriptions.**

- Show *Slaughter Lamb Evaluation* or another video on grading slaughter lambs.
- Point out characteristics of grades on live animals.
- Visit a stock show and identify market grades for lambs.

OBJECTIVE 15 **List qualifications for market grades of swine.**

- Use a live animal to discuss qualifications for market grades.
- Visit a swine farm and observe factors that determine market grades.

OBJECTIVE 16 **Name the criteria for slaughter grades of swine.**

- Visit a meat packing facility to examine quality-indicating characteristics of the lean and cutability.

OBJECTIVE 17 **Match slaughter grades of swine to their descriptions.**

- Show *Slaughter Hog Evaluation, Practice Slaughter Hog Evaluation,* or another video on grading swine.
- Invite a USDA extension agent to discuss qualifications for slaughter grades of swine.
- Visit a stock show and identify slaughter grades of swine.

OBJECTIVE 18 **Match feeder grades of swine to their descriptions.**

- Invite a USDA extension agent to discuss qualifications for feeder grades of swine.
- Visit a stock show and identify feeder grades of swine.
- Show *Feeder Pig Evaluation* or another video on grading feeder swine.

OBJECTIVE 19 — **Classify swine according to slaughter grades. (Assignment Sheet 3)**

- R See the general instructions for all Assignment Sheets.
- R Photocopy and distribute Handout 2.

OBJECTIVE 20 — **Name market classes, criteria, and grades of poultry.**

- O Show a video on poultry grades.
- O Invite a poultry grader or a USDA extension agent to discuss poultry grading.
- O Have students go to the grocery store and compare classes of chicken in the fresh and frozen meat departments.
- O Have a "chicken cooking party" where students can handle, cook, and taste the different classes of chicken.

OBJECTIVE 21 — **Name grades, criteria, and classes of eggs.**

- R Photocopy and distribute Handout 3.
- O Visit a supermarket and compare the prices of the different grades and weight classes of eggs.
- O Show *Practice Poultry Judging I and II, Egg Grading*, or another video on grading eggs.

OBJECTIVE 22 — **Discuss marketing eggs.**

- O Invite a large commercial producer and a small producer to discuss the egg market and compare methods of marketing.

EVALUATION — **Pretest**

- Use the unit Written Test for *both* the pretest and posttest. Give the students the pretest before they begin the unit.
- You may wish to use the CIMC publication *Measuring Learning and Competency Gains: The Pretest/Posttest Approach* for instructions and suggestions on giving pretests and using the results. Information for ordering this material is included in the optional resources section.
- Use pretest results to guide individual students in progressing through the unit, doing enrichment work, or moving to the next unit.

Focus Assignment

- Use an informal evaluation of the focus assignments as a diagnostic tool for determining if any students need extra help in reading comprehension or writing skills. Refer these students to their English instructor, Learning Resource Center, or Educational Enhancement Center.

Assignment Sheet

- Evaluate students on Assignment Sheet activities. Students must repeat an Assignment Sheet until they have mastered the activity.
- Complete each student's Competency Profile.

Skill Test

- Explain to the students that they will be asked to demonstrate the procedures on the Job Sheets as a skills test.
- Describe the rating scale used on the skills test.
- Reteach and retest as necessary.
- Complete each student's Competency Profile.

Posttest

- After they have completed the unit, give students the Written Test again.
- Explain to the students that they will be asked to demonstrate on the Written Test actions listed in the specific objectives.
- You may wish to use the CIMC publication *Measuring Learning and Competency Gains: The Pretest/Posttest Approach* for instructions and suggestions on giving posttests and using the results. Information for ordering this material is included in the optional resources section.
- Reteach and retest as necessary to meet individual student needs and state standards for student learning and competency gains.
- Complete the appropriate sections of the Competency Profiles.

- Review individual and group performance to evaluate teaching effectiveness. Adjust scope, sequence, or instructional methods for additional lessons as required.

REQUIRED RESOURCES

The items marked with an asterisk are included in the Instructor's Resource Package.

Publications

- Ray, Fredrick K. *Meat Inspection and Grading.* OSU Extension Facts No. 3993.

OPTIONAL RESOURCES

Publications

- *Introduction to Agricultural Products and Processing.* Stillwater, OK: CIMC, Oklahoma Department of Vocational and Technical Education, 1992.
- Publications available from the United States Department of Agriculture (USDA):
  - *Official United States Standards for Grades of Slaughter Cattle*
  - *Official United States Standards for Grades of Vealers and Slaughter Calves*
  - *Official United States Standards for Grades of Slaughter Lambs, Yearlings, and Sheep*
  - *Official United States Standards for Grades of Carcass Beef*
  - *Official United States Standards for Grades of Slaughter Swine*
  - *Official United States Standards for Grades of Pork Carcasses*
  - *Official United States Standards for Grades of Lamb, Yearling Mutton, and Mutton Carcasses*

- Publications available from the OSU Cooperative Extension Service (CR=Current Report, F=Extension Facts)
  - CR-507, *U.S. Meat and Poultry Demand*
  - F-488, *Meat Trends Consumption, Prices, and Production Costs*
  - F-3401, *Buying Beef for Home Freezers*
  - F-3656, *Buying and Managing Feeder Pigs*
  - F-3662, *Measuring Carcass Traits in Live Hogs*
  - F-3972, *Meat Inspection and Grading*
- *Measuring Learning and Competency Gains: The Pretest/Posttest Approach.* Stillwater, OK: CIMC, Oklahoma Department of Vocational and Technical Education, 1992. For ordering information call 800-522-5810.
- *Poultry and Egg Judging*, 4-H Member's Guide, Cooperative Extension Service, OSU, P1002-M.

Videos

- Creative Educational Video, P.O. Box 65265, Lubbock, TX 79424-5265. For ordering information call 800-922-9965.
  - *Beef Yield Grading*
  - *Beef Quality Grading*
  - *Practice Beef Yield Grading*
  - *Practice Beef Quality Grading*
  - *Practice Beef Quality Grading II*
  - *Market Lamb and Breeding Sheep Evaluation*
  - *Market Swine Evaluation*
  - *Market Cattle Evaluation*
  - *Slaughter Lamb Evaluation*
  - *Slaughter Hog Evaluation*
  - *Practice Slaughter Hog Evaluation*

- *Feeder Pig Evaluation*
- *Slaughter Cow Evaluation*
- *Slaughter Cattle Evaluation*
- *Livestock and Carcass Abnormalities*
- *Evaluating Ready-to-Cook Poultry*
- *Practice Poultry Judging - I*
- *Practice Poultry Judging - II*
- *Egg Grading*

- Livestock Judging Videotape Series. *NASCO Agricultural Sciences Catalog.* Nasco-Fort Atkinson, 901 Janesville Ave., P.O. Box 901, Fort Atkinson, WI 53538-0901; 800-558-9595, FAX 414-563-8296. (Lists many of the videos above, plus others)

- 4-H videos, available through OSU Cooperative Extension:
  - VT204, *Judging Market Lambs*
  - VT99, *Judging Market Steers*
  - VT87, *Swine Judging*

UNIT REFERENCES

Publications

- USDA publications:
  - *Official United States Standards for Grades of Slaughter Lambs, Yearlings, and Sheep*
  - *Official United States Standards for Grades of Carcass Beef*
  - *Official United States Standards for Grades of Slaughter Swine*
  - *Official United States Standards for Grades of Pork Carcasses*

- OSU Cooperative Extension Service Publications (CR=Current Report, F=Extension Facts)
  - CR-507, *U.S. Meat and Poultry Demand*
  - F-488, *Meat Trends Consumption, Prices, and Production Costs*
  - F-3656, *Buying and Managing Feeder Pigs*
  - F-3662, *Measuring Carcass Traits in Live Hogs*
  - F-3972, *Meat Inspection and Grading*
- Barrick, R. Kirby and Hobart L. Harmon. *Animal Production and Management.* New York: Gregg Division, McGraw-Hill Book Company, 1988.
- Bearden, H. Joe, and John W. Fuquay. *Applied Animal Reproduction.* Englewood Cliffs, NJ: Prentice Hall, 1992.
- Cooper, Elmer L. *Agriscience Fundamentals & Applications.* Albany, NY: Delmar Publishers Inc., 1990.
- Cooper, Elmer L. *Agricultural Mechanics: Fundamentals & Applications,* (2nd ed.). Albany, NY: Delmar Publishers Inc., 1992.
- Cullen, Patrick T. *Applied Farm Animal Health: A Practical Guide.* Great Britain: Pergamon Press, 1991.
- Ensminger, M.E. *Animal Science Digest.* (1st ed.). Danville, IL: Interstate Publishers, Inc., 1991.
- Ensminger, M.E. *The Stockman's Handbook,* (7th ed.). Danville, IL: Interstate Publishers, Inc., 1992.
- Gillespie, James R. *Modern Livestock & Poultry Production,* (4th ed.). Albany, NY: Delmar Publishers Inc., 1992.
- Herren, Ray V., and Roy L. Donahue. *The Agriculture Dictionary.* Albany, NY: Delmar Publishers, Inc., 1991.
- Herren, Ray V. *The Science of Animal Agriculture.* Albany, NY: Delmar Publishers, Inc., 1994.
- *Meat and Poultry Processing.* Stillwater, OK: CIMC, Oklahoma Department of Vocational and Technical Education, 1990.

- Pierce, Greg. *Agricultural Livestock Skills*. Stillwater, OK: CIMC, Oklahoma Department of Vocational and Technical Education, 1979.

ANSWERS

MARKET GRADES AND CLASSES OF LIVESTOCK

D-2

ASSIGNMENT SHEETS

OBJECTIVE 6

Assignment Sheet 1

1. 2.5
2. 2.1
3. 3.48
4. 2.7
5. 3.3

OBJECTIVE 10

Assignment Sheet 2

Slaughter and feeder grades to be determined by the instructor.

OBJECTIVE 19

Assignment Sheet 3

Grades using Method 1 and Method 2 to be determined by the instructor.

WRITTEN TEST

OBJECTIVE 1

1.	B	6.	A
2.	D	7.	D
3.	A	8.	A
4.	C	9.	C
5.	D	10.	C

OBJECTIVE 2

Answer may include any eight of the following, in any order:

- use
- sex
- age
- thrift
- natural fleshing
- breeding
- uniformity
- absence of horns
- temperament and disposition

OBJECTIVE 3

1. **vealers** – cattle under three months of age
2. **calves** – cattle between the vealer and yearling stage
3. **yearlings** – cattle between 12 and 24 months of age
4. **two-year-olds** – cattle from 24 months to 36 months of age
5. **older cattle** – cattle over 36 months of age

OBJECTIVE 4

Answer must include all of the following, in any order:

- amount of external fat
- size of rib eye muscle
- quantity of kidney, pelvic, and heart fat
- carcass weight (warm)

OBJECTIVE 5

1.	A	6.	D	11.	B
2.	D	7.	C	12.	C
3.	A	8.	C		
4.	B	9.	B		
5.	B	10.	B		

OBJECTIVE 6

Evaluated on Assignment Sheet 1.

OBJECTIVE 7

1. Answer must include all of the following, in any order:
   - maturity
   - marbling
   - muscle firmness
2. Answer may include any eight of the following, in any order:
   - abundant
   - moderately abundant
   - slightly abundant
   - moderate
   - modest
   - small
   - slight
   - traces
   - practically devoid
   - devoid

3. Answer may include any five of the following, in any order:

- bobby beef, less than 3 weeks
- veal, 3 weeks to 3 months
- calf, 3 to 9 months
- Beef A, 9 to 30 months
- Beef B, 30 to 42 months
- Beef C, 42 to 72 months
- Beef D, 72 to 96 months
- Beef E, more than 96 months

OBJECTIVE 8

1. K
2. G
3. E
4. C
5. A
6. D
7. F
8. H

OBJECTIVE 9

1, 4, 6, 8, 9

OBJECTIVE 10

Evaluated on Assignment Sheet 2.

OBJECTIVE 11

Answer must include all of the following, in any order:

- use
- sex
- age
- weight

OBJECTIVE 12

1. I
2. B
3. A
4. J
5. G
6. H
7. C
8. E

OBJECTIVE 13

1. Answer must include all of the following, in any order:
   - marbling
   - texture
   - color
2. a. Grade 3
   b. Grade 4
   c. Grade 1
   d. Grade 5
   e. Grade 2

OBJECTIVE 14

1. D
2. A
3. E
4. B

OBJECTIVE 15

Answer must include all of the following, in any order:

- weight
- conformation
- sex

OBJECTIVE 16

1. Answer must include three of the following, in any order:
   - firmness of the fat and lean
   - color of lean
   - amount of feathering
   - belly thickness
2. a. No. 3
   b. No. 4
   c. No. 1
   d. No. 2

OBJECTIVE 17

1. F
2. I
3. G
4. H
5. E

OBJECTIVE 18

1. G
2. E
3. F
4. I
5. H

OBJECTIVE 19

Evaluated on Assignment Sheet 3.

OBJECTIVE 20

Part 1: Market Classes

1. broiler or fryer
2. Rock Cornish fryer, roaster, or hen
3. roaster or roasting chicken
4. hen, fowl, or baking or stewing chicken
5. Rock Cornish hen or Cornish game hen
6. cock or rooster
7. capon

Part 2: USDA Poultry Grades

1. Grade C
2. Grade A
3. Grade B

Part 3: Criteria

Answer any include any five of the following, in any order:

- conformation
- skin covering
- fat covering
- absence of pinfeathers
- absence of tears and cuts
- absence of disjointed and broken bones
- absence of discolored skin, bruises, and blemishes

OBJECTIVE 21

1. Answer must all of the following, in any order:
   - AA
   - A
   - B
   - Dirty
2. Answer must all of the following, in any order:
   - Jumbo
   - Extra Large
   - Large
   - Medium
   - Small
   - Peewee
3. Answer must include all four of the following, in any order:
   - shell
   - air cell
   - white
   - yolk

OBJECTIVE 22

1. Egg production decreased as a result of changes in consumer purchasing habits. Consumers are eating less of foods that are seen as relatively high in cholesterol, such as eggs.
2. The grower does not own the bird. The grower's compensation is based on the output of the flock.
3. Eggs not produced under a vertical integration contract are sold to local buyers, produce dealers, or marketed through cooperatives.

CIMC
TEST CODE SHEET

VOCATIONAL PROGRAM (BOOK TITLE) ANIMAL SCIENCE

UNIT NUMBER AND TITLE D-2 – MARKET GRADES AND CLASSES OF LIVESTOCK

TOTAL NUMBER OF TEST QUESTIONS 121

TOTAL NUMBER OF BASIC SKILL QUESTIONS 7

OBJECTIVE NUMBER	TEST QUESTION NUMBER(S)	BASIC SKILL CODE(S)
1	1-10	X
2	1-8	X
3	1-5	X
4	1-4	X
5	1-11	X
5	12	M
6	Evaluated on Assignment Sheet 1	
7	1-3	X
8	1-8	X
9	1-10	X
10	Evaluated on Assignment Sheet 2	
11	1-4	X
12	1-8	X
13	1, 2 a-e	X
14	1-4	X
15	1-3	X

CIMC
TEST CODE SHEET

VOCATIONAL PROGRAM (BOOK TITLE) ANIMAL SCIENCE

UNIT NUMBER AND TITLE D-2 – MARKET GRADES AND CLASSES OF LIVESTOCK

OBJECTIVE NUMBER	TEST QUESTION NUMBER(S)	BASIC SKILL CODE(S)
16	1, 2 a-d	X
17	1-5	X
18	1-5	X
19	Evaluated on Assignment Sheet 3	
20	Part 2: 1-7, Part 2: 1-3, Part 1: 1-5,	X
21	1-3	W
22	1	U
22	2, 3	W

POULTRY AND EXOTIC LIVESTOCK D-3

Required Activities and Resources (R)

These are fully integrated components of this CIMC curriculum. They are usually packaged in or with the curriculum and are essential in meeting the learning objectives. To individualize this unit, use the LAP Sheet supplied in your resources.

- Reproducible Handouts and Transparency Masters are included in the Instructor's Resource Package. Handouts should be copied for all students. Transparency Masters should be used to make overhead transparencies for use during instruction. A small copy of each Transparency Master appears in the student's Information Sheets.

- Non-reproducible resources are included in the student's curriculum.

Optional Activities and Resources (O)

These are suggested high-interest activities to help deliver learning objectives to students or to let students achieve objectives in an applied context. Select as many as you wish to use. Some activities use extra resources for further information about unit content. You can make them available in the classroom for in-depth study or optional activities, but their use is not required for meeting CIMC unit objectives.

FOCUS ASSIGNMENTS

Prereading

R Have students read the Handout "Is this Agriculture?"

Writing

R Have students write a short discussion (one paragraph to one page) over the information read.

GENERAL INSTRUCTIONS

Assignment Sheets

- [R] Review the directions and any specific guidelines.
- [R] Make certain that any needed materials from the Instructor's Resource Package are available.
- [R] Have the students complete the Assignment Sheet. Evaluate each student's performance and provide reteaching and retesting as necessary. Have the students repeat the Assignment Sheet until they achieve mastery.
- [R] Complete each student's Competency Profile.
- [O] Have the students volunteer to read aloud the directions and any special guidelines.
- [O] Return the completed Assignment Sheets to the students so that they may use them for later reference if needed.

Job Sheets

- [R] Review the introduction and evaluation criteria for the Job Sheet. Remind the students that they should not fill in the blanks in the Yes/No columns.
- [R] Review and explain all general guidelines, safety cautions, and warnings.
- [R] Make sure that all tools, equipment, and supplies are available.
- [R] Demonstrate each of the procedures outlined in the Job Sheet.
- [R] Allow the students to practice the Job Sheet skills before skills testing. Coach, correct, and supervise as necessary.
- [R] Have the students complete the Job Sheet. Evaluate each student's performance and provide remediation as necessary. Have the students repeat the Job Sheet until they achieve mastery.
- [R] Complete each student's Competency Profile.
- [R] Return the completed Job Sheets to the students so that they may use them for later reference if needed.
- [O] Have the students volunteer to read aloud the job guidelines, cautions, and warnings.

LAP Sheets

The LAP Sheets are an optional component that can be used to individualize instruction. The following instructions should be followed only if you are using the LAP Sheets.

- R Explain the specific procedures to be followed to the students before they begin using the LAP Sheet. Be sure that each student understands the procedures for using the LAP Sheet.
- R If you want the student to complete any of the assignments on the LAP Sheet that are labeled optional, assign these to the student. Be sure to provide any needed resources.

OBJECTIVE 1

Choose the word or phrase to complete statements about poultry trends and production.

- O Discuss poultry trends and production. Ask students about their consumption of poultry.
- O Have students interview family and friends about poultry consumption.
- O Have students visit a grocery store and identify the various poultry products available. Have students look for new ways of packaging and marketing poultry. For example, turkey franks or frozen chicken nuggets.
- O Obtain USDA publications relating to poultry trends and production and make them available for students to read.
- O Obtain OSU publication CR-204 *Broiler Industry Overview: Oklahoma and the U.S.* and make it available for students to read. Discuss the importance of the poultry industry in Oklahoma.

OBJECTIVE 2

List types of poultry enterprises.

- O Discuss the types of poultry enterprises. Emphasize that most poultry operations are specialized.
- O Obtain trade journals and make them available for students to read. Some examples are *Poultry Digest, Turkey World, Broiler Industry, Poultry International,* and *Egg Industry.* The above magazines are published by Watt Publishing Co., 122 S. Wesley Ave., Mt. Morris, IL 61054-1497, phone 1-815-734-4171.

OBJECTIVE 3 **Discuss criteria for selecting poultry.**

O Discuss criteria for selecting poultry. Bring photos/pictures of poultry and have students evaluate.

OBJECTIVE 4 **Select chickens for meat, egg, and breeding production. (Assignment Sheet 1)**

R See the general instructions for all Assignment Sheets.

OBJECTIVE 5 **Compare the cost of selected criteria for chicken and turkey production. (Assignment Sheet 2)**

R See the general instructions for all Assignment Sheets.

OBJECTIVE 6 **List sources for poultry.**

O Discuss sources for poultry. Obtain catalogs and/or sales information from hatcheries and make them available for students to read.

O Arrange for students to visit a commercial hatchery. Be sure to obtain permission before visiting.

OBJECTIVE 7 **Determine the number and type of chicks to order for a poultry operation. (Assignment Sheet 3)**

R See the general instructions for all Assignment Sheets.

OBJECTIVE 8 **Discuss poultry housing and equipment.**

O Discuss poultry housing and equipment. Bring poultry supply catalogs for students to review.

OBJECTIVE 9 **Choose the word or phrase to complete statements about poultry feed and flock health plans.**

O Discuss poultry feed and flock health plans. Bring examples of poultry feeds for students to examine.

OBJECTIVE 10

Discuss marketing poultry.

- Discuss marketing poultry. Emphasize that vertical integration contracts affect the marketing of poultry.
- Discuss the grades of poultry and the grades and classes of eggs.
- Have students research a company involved in the marketing of poultry.

OBJECTIVE 11

Select management practices for chickens: meat, egg, and breeding production.

- Discuss management practices for chickens used for meat, egg, and breeding production.
- Obtain trade journals and make them available for students to read. Some examples are *Poultry Digest*, *Broiler Industry*, *Poultry International*, and *Egg Industry*. The above magazines are published by Watt Publishing Co., 122 S. Wesley Ave., Mt. Morris, IL 61054-1497, phone 1-815-734-4171.

OBJECTIVE 12

Select management practices for turkeys.

- Obtain journals such as *Turkey World* and make them available for students to read.
- Write to the National Turkey Federation, 11319 Sunset Hills Road, Reston, VA 22090 for information on turkey production.

OBJECTIVE 13

Select management practices for geese and ducks.

- Discuss management practices for geese and ducks.
- Arrange for students to visit a commerical facility which raises ducks or geese. Be sure to receive permission before visiting.

OBJECTIVE 14

State guidelines for handling eggs.

- Have students candle eggs. For information on candling eggs, refer to *Agricultural Products and Processing*, Unit IV, Job Sheet 1.

OBJECTIVE 15 **Choose the word or phrase to complete statements about captive game bird production.**

- Discuss captive game bird production.
- Arrange for students to visit a captive game bird facility. Be sure to receive permission before visiting.

OBJECTIVE 16 **Choose the word or phrase to complete statements about rabbit production.**

- Write to the American Rabbit Breeders Association, 1925 S. Main, Box 426, Bloomington, IL 61701 for information on raising rabbits.

OBJECTIVE 17 **Choose the word or phrase to complete statements about llama production.**

- Write to the Llama Association of North America, P.O. Box 1882, Minden, NV 89423 for information on llamas.
- Obtain OSU Extension Facts F-9122 *Some General Information for the Potential Llama Owner* and make it available for students to read.

OBJECTIVE 18 **Choose the word or phrase to complete statements about ostrich and emu production.**

- Obtain OSU Extension Facts F-3988 *Ostrich Production* and make it available for students to read.
- Obtain ostrich and emu magazines and make them available for students to read. Several magazines are *The Ostrich News*, *Exclusively Ostrich*, and *The Ratite Trader*.
- Arrange for students to visit an ostrich or emu operation. Be sure to receive permission before visiting.

OBJECTIVE 19

Choose the word or phrase to complete statements about beekeeping.

- O Write to the American Honey Producers Association, P.O. Box 584, Cheshire, CT 06410 for information on beekeeping.
- O Obtain journals on beekeeping and make them available for students to read. Some journals are:
  - *American Bee Journal*, 51 S. 2nd St., Hamilton, IL 62341
  - *Bee Culture*, The A.I. Root Company, Medina, OH
  - *Bee Science*, Beekeeping Education Service, P.O. Box 817, Cheshire, CT 06410
  - *The Speedy Bee*, P.O. Box 998, Jesup, GA 31545
- O Send for a catalog of books, slide sets, videos, and prints on beekeeping from Beekeeping Education Service, P.O. Box 817, Cheshire, CT 06410.
- O Arrange for students to visit a beekeeping facility. Be sure to obtain permission before visiting.

OBJECTIVE 20

Choose the word or phrase to complete statements about aquaculture.

- O Obtain OSU Extension Fact Sheets No. F-9201 *Getting Started in Aquaculture*, and No. F-9002 *Catfish Farming* and make them available for students to read.

OBJECTIVE 21

Discuss exotic animal production.

- R Discuss exotic animal production. Emphasize that exotic animal production can be a risky venture for producers if large initial investments are required.

OBJECTIVE 22

Discuss markets and resources for exotic animals.

- O Discuss markets and resources for exotic animals. Emphasize that markets and resources for exotic animals are not as established or as available as those of traditional animals.

OBJECTIVE 23

Locate resources for one type of exotic animal production. (Assignment Sheet 4)

R See the general instructions for all Assignment Sheets.

OBJECTIVE 24

Create a brochure to promote a hypothetical poultry or exotic animal operation. (Assignment Sheet 5)

R See the general instructions for all Assignment Sheets.

OBJECTIVE 25

Research one type of exotic animal production. (Assignment Sheet 6)

R See the general instructions for all Assignment Sheets.

OBJECTIVE 26

List sources of funding and financing for exotic animal production.

O Discuss sources of funding and financing for exotic animal production.

EVALUATION

Pretest

- Use the unit Written Test for *both* the pretest and posttest. Give the students the pretest before they begin the unit.
- You may wish to use the CIMC publication *Measuring Learning and Competency Gains: The Pretest/Posttest Approach* for instructions and suggestions on giving pretests and using the results. Information for ordering this material is included in the optional resources section.
- Use pretest results to guide individual students in progressing through the unit, doing enrichment work, or moving to the next unit.

Focus Assignment

- Use an informal evaluation of the focus assignments as a diagnostic tool for determining if any students need extra help in reading comprehension or writing skills. Refer these students to their English instructor, Learning Resource Center, or Educational Enhancement Center.

Assignment Sheet

- Evaluate students on Assignment Sheet activities. Students must repeat an Assignment Sheet until they have mastered the activity.
- Complete each student's Competency Profile.

Skill Test

- Explain to the students that they will be asked to demonstrate the procedures on the Job Sheets as a skills test.
- Describe the rating scale used on the skills test.
- Reteach and retest as necessary.
- Complete each student's Competency Profile.

Posttest

- After they have completed the unit, give students the Written Test again.
- Explain to the students that they will be asked to demonstrate on the Written Test actions listed in the specific objectives.
- You may wish to use the CIMC publication *Measuring Learning and Competency Gains: The Pretest/Posttest Approach* for instructions and suggestions on giving posttests and using the results. Information for ordering this material is included in the optional resources section.
- Reteach and retest as necessary to meet individual student needs and state standards for student learning and competency gains.
- Complete the appropriate sections of the Competency Profiles.
- Review individual and group performance to evaluate teaching effectiveness. Adjust scope, sequence, or instructional methods for additional lessons as required.

REQUIRED RESOURCES

The items marked with an asterisk are included in the Instructor's Resource Package.

Publications

- "Is this Agriculture?" Handout.*

OPTIONAL RESOURCES

Publications

- Beem, Marley. *Getting Started in Aquaculture*, OSU Extension Facts No. 9201. Stillwater, OK: Oklahoma State University Cooperative Extension Service, 1990.
- Ensminger, M.E. *Poultry Science* (3rd ed.). Danville, IL: Interstate Publishers, Inc., 1992.
- *Measuring Learning and Competency Gains: The Pretest/Posttest Approach.* Stillwater, OK: CIMC, Oklahoma Department of Vocational and Technical Education, 1992. For ordering information call 800-522-5810.
- Moreng, Robert, and John S. Avens. *Poultry Science and Production.* Prospect Heights, IL: Waveland Press, Inc., 1985.
- North, Mack O. and Donald D. Bell. *Commercial Chicken Production Manual*, (4th ed.). New York: Van Nostrand Reinhold, 1990.
- Thedford, T.R. *Some General Information for the Potential Llama Owner*, OSU Extension Facts F-9122. Stillwater, OK: Oklahoma State University Cooperative Extension Service, 1993.

UNIT REFERENCES

Publications

- Barrick, R. Kirby and Hobart L. Harmon. *Animal Production and Management.* New York: Gregg Division, McGraw-Hill Book Company, 1988.
- Batty, J. *Domesticated Ducks and Geese.* England: Fanciers Suppliers Ltd., 1985.
- Beem, Marley. *Getting Started in Aquaculture*, OSU Extension Facts No. 9201. Stillwater, OK: Oklahoma State University Cooperative Extension Service, 1990.

- Berry, Joe. *Ostrich Production.* OSU Extension Facts No. 3988. Stillwater, OK: Oklahoma State University Cooperative Extension Service, 1990.
- Cheeke, Peter R., et al. *Rabbit Production.* Danville, IL: The Interstate Printers & Publishers, Inc., 1987.
- Conner, Doyle. "Exotic Animals Attract Attention." *Countryside & Small Stock Journal,* Vol. 73, No. 5, Sept./Oct., 1989.
- Coody, Dale. *Ostriches: Your Great Opportunity.* Lawton, OK: Dale Coody, 1987.
- Crane, Eva. *Bees and Beekeeping: Science, Practice and World Resources.* New York: Comstock Publishing Associates, 1990.
- "Deer are Becoming Farm Animals." *Countryside & Small Stock Journal,* Vol. 74, No. 5, Sept./Oct., 1990.
- Ensminger, M.E. *Animal Science Digest.* Danville, IL: Interstate Publishers, Inc., 1991.
- Gillespie, James R. *Modern Livestock & Poultry Production,* (4th ed.). Delmar Publishers, Inc., 1992.
- *Llama Association of North America (pamphlet).* Minden, NV: Llama Association of North America, 1992.
- Meyer, Owen. *The Beekeeper's Handbook.* New York: Sterling Publishing Co., Inc., 1981.
- McKean, Bob. *The Wonderful World of Ostriches.* Nevada, MO: McKean Publishing Co., 1988.
- North, Mack O. and Donald D. Bell. *Commercial Chicken Production Manual,* (4th ed.). New York: Van Nostrand Reinhold, 1990.
- Parkhurst, Carmen R. and George J. Mountney. *Poultry Meat, and Egg Production.* New York: Van Nostrand Reinhold Company, 1988.
- Thedford, T.R. *Some General Information for the Potential Llama Owner,* OSU Extension Facts F-9122. Stillwater, OK: Oklahoma State University Cooperative Extension Service, 1993.

ASSIGNMENT SHEETS

OBJECTIVE 4

Assignment Sheet 1

Student answers will vary.

OBJECTIVE 5

Assignment Sheet 2

Student answers will vary.

OBJECTIVE 7

Assignment Sheet 3

Student answers will vary.

OBJECTIVE 23

Assignment Sheet 4

Student answers will vary. Students should locate resources for one type of exotic animal production.

OBJECTIVE 24

Assignment Sheet 5

Student answers will vary. Students should create a brochure to promote a hypothetical poultry or exotic animal operation. Brochures should contain correct grammar, spelling, and punctuation and follow the guidelines given in the Assignment Sheet.

OBJECTIVE 25

Assignment Sheet 6

Students should research one type of exotic animal production. Reports should contain correct grammar, spelling, and punctuation. Oral presentations should include proper speaking techniques.

WRITTEN TEST

OBJECTIVE 1

1. B
2. A
3. C
4. D
5. A
6. B

OBJECTIVE 2

Answer should include the following:

- Egg production
- Broiler production
- Foundation breeders
- Hatcheries

OBJECTIVE 3

1. Poultry may be selected according to physical appearance, pedigree, and/or family selection.
2. Answer should contain four of the following:
   - Bright and prominent eyes
   - Large comb with good color
   - Moderately deep and broad head with a slightly flattened skull
   - Large body capacity
   - Full, soft, and pliable abdomen
   - Thin and flexible pubic bones
   - Flat and wedge-shaped shanks
   - Soft and pliable skin
   - Fully feathered

- No specific disqualifications listed in the American Standard of Perfection

3. Answer should contain three of the following:

   - Carcass should be free of deformities that detract from its appearance or that affect the normal distribution of flesh
   - Carcass should have a well-developed covering of flesh
   - Carcass should have a well-developed layer of fat in the skin
   - Carcass should be free of pinfeathers, hairs, and diminutive feathers
   - Carcass should be free from exposed flesh resulting from cuts made during processing
   - Carcass should be free of discolorations of the skin and flesh
   - Carcass should be free of disjointed or broken bones

4. Answer should contain three of the following:

   - Symmetry – the bird should have a broad, deep, rectangular body and desirable balance
   - Head and neck – the head should be short and broad with bright, alert eyes and a strong, curved beak; the neck should be medium-length and blend smoothly into the breast and back
   - Back and ribs – the back should be broad and relatively flat
   - Breast – should be long, broad, deep and well-rounded
   - Wings – should be strong, smoothly folded, and proportionate to the body size
   - Legs and thighs – should balance body, well-fleshed, feet should be large and toes should be straight
   - General condition – bird should have an alert appearance, full feathers

OBJECTIVE 4

Evaluated on Assignment Sheet 1.

OBJECTIVE 5

Evaluated on Assignment Sheet 2.

OBJECTIVE 6

Answer should include the following:

- Commercial hatcheries
- Growers which produce started pullets or ready-to-lay hens
- Commercial flock
- Hatching chicks on the farm

OBJECTIVE 7

Evaluated on Assignment Sheet 3.

OBJECTIVE 8

1. Answer should include:
   - Buildings codes and regulations
   - Proximity to surface roads
   - Access to utilities and water
2. Answer should include any four of the following:
   - Well constructed
   - Provide protection
   - Sanitary and easily cleaned
   - Adequate space for animals and storage
   - Attractive
   - Flexible
   - Reduce labor costs
   - Safe
   - Provide for animal health needs

3. Answer should include any three of the following:

   - ☐ Temperature and humidity
   - ☐ Insulation and vapor barrier
   - ☐ Ventilation
   - ☐ Lighting
   - ☐ Sanitation

OBJECTIVE 9

1. C
2. A
3. B

OBJECTIVE 10

1. By vertical integration contracts
2. Costs for production, transportation, assembly, processing, and retailing
3. USDA

OBJECTIVE 11

1, 2, 3, 5, 7, 9, 10, 12, 14, 16, 17, 18, 19, 21, 22

OBJECTIVE 12

1, 2, 4, 5, 7, 9, 10, 12, 13

OBJECTIVE 13

1, 2, 3, 5, 6, 8, 9, 10, 12, 14, 15, 16

OBJECTIVE 14

Answer should include eight of the following:

- Handle eggs carefully.
- Eggs should be kept cool and in high humidity.
- Gather eggs frequently.
- Clean soiled eggs.
- Do NOT store eggs close to anything with a strong odor.
- Candle eggs.

- Separate eggs into weight classes.
- Properly pack eggs.
- Keep all equipment used in handling eggs clean.
- Do NOT hold eggs for more than one week.

OBJECTIVE 15

1. A
2. B
3. D

OBJECTIVE 16

1. B
2. A
3. A
4. D
5. C
6. A
7. C

OBJECTIVE 17

1. D
2. A
3. C
4. B
5. C

OBJECTIVE 18

1. B
2. C
3. A
4. D

OBJECTIVE 19

1. D
2. A
3. C
4. B
5. D

OBJECTIVE 20

1. C
2. D
3. B
4. A

OBJECTIVE 21

1. Exotic animal production includes the production of animals and animal products which are not common in a specific area.
2. Because markets are often not stable or clearly identified
3. Support systems, proven management practices, and research in health and nutrition
4. Follow the principles of sound agricultural management
5. High

OBJECTIVE 22

1. Often they are not clearly identified
2. Identifying them and direct marketing
3. Advertising in journals and other sources
4. Associations, publications and journals, and universities

OBJECTIVE 23 **Evaluated on Assignment Sheet 4.**

OBJECTIVE 24 **Evaluated on Assignment Sheet 5.**

OBJECTIVE 25 **Evaluated on Assignment Sheet 6.**

OBJECTIVE 26 Answer should include the following:

- Commercial banks
- Credit associations
- Farmers Home Administration
- Federal Land Bank
- Individuals
- Insurance companies
- Small Business Administration

CIMC
TEST CODE SHEET

VOCATIONAL PROGRAM (BOOK TITLE) ANIMAL SCIENCE

UNIT NUMBER AND TITLE D-3 – POULTRY AND EXOTIC LIVESTOCK

TOTAL NUMBER OF TEST QUESTIONS 132

TOTAL NUMBER OF BASIC SKILL QUESTIONS 22

OBJECTIVE NUMBER	TEST QUESTION NUMBER(S)	BASIC SKILL CODE(S)
1	1-6	U
2	1-4	X
3	1-4	X
4	Evaluated on Assignment Sheet 1	
5	Evaluated on Assignment Sheet 2	
6	1-4	X
7	Evaluated on Assignment Sheet 3	
8	1-3	X
9	1-3	S
10	1, 3	X
10	2	U
11	1-22	X
12	1-13	X
13	1-18	X
14	1-8	X
15	1-3	X

CIMC
TEST CODE SHEET

VOCATIONAL PROGRAM (BOOK TITLE) ANIMAL SCIENCE

UNIT NUMBER AND TITLE D-3 – POULTRY AND EXOTIC LIVESTOCK

OBJECTIVE NUMBER	TEST QUESTION NUMBER(S)	BASIC SKILL CODE(S)
16	1-7	X
17	1-5	X
18	1-4	X
19	1-5	X
20	1	S
20	2-4	X
21	1-5	X
22	1-4	U
23	Evaluated on Assignment Sheet 4	
24	Evaluated on Assignment Sheet 5	
25	Evaluated on Assignment Sheet 6	
26	1-7	U

Required Activities and Resources (R)

These are fully integrated components of this CIMC curriculum. They are usually packaged in or with the curriculum and are essential in meeting the learning objectives. To individualize this unit, use the LAP Sheet supplied in your resources.

- Reproducible Handouts and Transparency Masters are included in the Instructor's Resource Package. Handouts should be copied for all students. Transparency Masters should be used to make overhead transparencies for use during instruction. A small copy of each Transparency Master appears in the student's Information Sheets.

- Non-reproducible resources are included in the student's curriculum.

Optional Activities and Resources (O)

These are suggested high-interest activities to help deliver learning objectives to students or to let students achieve objectives in an applied context. Select as many as you wish to use. Some activities use extra resources for further information about unit content. You can make them available in the classroom for in-depth study or optional activities, but their use is not required for meeting CIMC unit objectives.

FOCUS ASSIGNMENTS

Prereading

R Have students read *Seasonal Prices for Cattle and Feedgrains*, OSU Extension Facts No. 505 and *Seasonal Hog Prices and Profits*, OSU Extension Facts No. 508.

Writing

R Have students write a short essay (one paragraph to one page) describing how producers might use seasonal prices.

GENERAL INSTRUCTIONS

Assignment Sheets

- [R] Review the directions and any specific guidelines.
- [R] Make certain that any needed materials from the Instructor's Resource Package are available.
- [R] Have the students complete the Assignment Sheet. Evaluate each student's performance and provide reteaching and retesting as necessary. Have the students repeat the Assignment Sheet until they achieve mastery.
- [R] Complete each student's Competency Profile.
- [O] Have the students volunteer to read aloud the directions and any special guidelines.
- [O] Return the completed Assignment Sheets to the students so that they may use them for later reference if needed.

Job Sheets

- [R] Review the introduction and evaluation criteria for the Job Sheet. Remind the students that they should not fill in the blanks in the Yes/No columns.
- [R] Review and explain all general guidelines, safety cautions, and warnings.
- [R] Make sure that all tools, equipment, and supplies are available.
- [R] Demonstrate each of the procedures outlined in the Job Sheet.
- [R] Allow the students to practice the Job Sheet skills before skills testing. Coach, correct, and supervise as necessary.
- [R] Have the students complete the Job Sheet. Evaluate each student's performance and provide remediation as necessary. Have the students repeat the Job Sheet until they achieve mastery.
- [R] Complete each student's Competency Profile.
- [R] Return the completed Job Sheets to the students so that they may use them for later reference if needed.
- [O] Have the students volunteer to read aloud the job guidelines, cautions, and warnings.

LAP Sheets

The LAP Sheets are an optional component that can be used to individualize instruction. The following instructions should be followed only if you are using the LAP Sheets.

R Explain the specific procedures to be followed to the students before they begin using the LAP Sheet. Be sure that each student understands the procedures for using the LAP Sheet.

R If you want the student to complete any of the assignments on the LAP Sheet that are labeled optional, assign these to the student. Be sure to provide any needed resources.

OBJECTIVE 1

Choose the word or phrase to complete statements about livestock price trends and cycles.

R Discuss livestock price trends and cycles.

O Obtain USDA publications concerning livestock price trends and cycles and make them available for students to read. Some examples of USDA publications that relate to price trends include:

- *Cattle on Feed Report*
- *Hog and Pig Report*
- *Cattle Inventory Report*
- *Livestock Meat Wool Market News: Weekly Summary and Statistics*

O Have students watch a television program or listen to a radio program that discusses livestock prices.

O Have students interview family and friends about their meat consumption and changes in their diet over the years.

O Obtain OSU Extension Facts No. F-488 *Meat Trends: Consumption, Prices, and Production Costs*, F-497 *Price Spreads for Beef and Pork*, F-511 *A Profile of Food Consumption Trends and Changing Market Institutions*, CR-507 *U.S. Meat and Poultry Demand*, and/or CR-528 *Beef By-Product Values: Trends and Current Issues* and make them available for students to read.

OBJECTIVE 2 **Discuss supply and demand.**

- O Discuss supply and demand. Create different supply and demand scenarios and have students draw the supply and demand curves.

  EXAMPLE: A shift in the demand curve for turkey meat

- O Have students write a report on changes in consumer demand for a specific commodity.

  EXAMPLE: Beef or poultry

- O Have students give a brief (2-3 minute) oral presentation on their report.

OBJECTIVE 3 **Select true statements about factors affecting price variations.**

- O Discuss factors affecting price variations. Emphasize that price cycles are not as evident as they used to be.

- O Discuss the fact that kosher slaughtered animals and Jewish holidays exert a minor influence on livestock markets in the eastern markets.

OBJECTIVE 4 **Match various types of livestock to times of the year when it would be most profitable to market and/or purchase them.**

- R Discuss times of the year when it would be most profitable to market and/or purchase livestock. Discuss seasonal price indexes and how they can be used by the producer. Emphasize that seasonal price indexes are only **one** management tool for evaluating buying and selling decisions. Producers must be aware of other factors that can influence prices and their profits.

- O Obtain OSU Extension Facts No. 506 *Seasonal Cattle Feeding Profits* and/or No. 521 *Cattle Marketing Plan* and make them available for students to read.

- O Obtain USDA publications on livestock price trends and cycles and make them available for students to read.

OBJECTIVE 5

Compile market prices. (Assignment Sheet 1)

R See the general instructions for all Assignment Sheets.

R Instruct the class to compile market reports at the beginning of the school year. This Assignment Sheet may be done as a class project.

O For further exploration of market prices refer to the Commodity Marketing contest.

OBJECTIVE 6

Interpret trends and cycles. (Assignment Sheet 2)

R See the general instructions for all Assignment Sheets.

OBJECTIVE 7

Determine ways in which progressive livestock producers use market changes.

O Discuss ways in which progressive livestock producers use market changes. Emphasize that understanding the market and market changes requires study and analysis.

EVALUATION

Pretest

- Use the unit Written Test for *both* the pretest and posttest. Give the students the pretest before they begin the unit.
- You may wish to use the CIMC publication *Measuring Learning and Competency Gains: The Pretest/Posttest Approach* for instructions and suggestions on giving pretests and using the results. Information for ordering this material is included in the optional resources section.
- Use pretest results to guide individual students in progressing through the unit, doing enrichment work, or moving to the next unit.

Focus Assignment

- Use an informal evaluation of the focus assignments as a diagnostic tool for determining if any students need extra help in reading comprehension or writing skills. Refer these students to their English instructor, Learning Resource Center, or Educational Enhancement Center.

Assignment Sheet

- Evaluate students on Assignment Sheet activities. Students must repeat an Assignment Sheet until they have mastered the activity.
- Complete each student's Competency Profile.

Skill Test

- Explain to the students that they will be asked to demonstrate the procedures on the Job Sheets as a skills test.
- Describe the rating scale used on the skills test.
- Reteach and retest as necessary.
- Complete each student's Competency Profile.

Posttest

- After they have completed the unit, give students the Written Test again.
- Explain to the students that they will be asked to demonstrate on the Written Test actions listed in the specific objectives.
- You may wish to use the CIMC publication *Measuring Learning and Competency Gains: The Pretest/Posttest Approach* for instructions and suggestions on giving posttests and using the results. Information for ordering this material is included in the optional resources section.
- Reteach and retest as necessary to meet individual student needs and state standards for student learning and competency gains.
- Complete the appropriate sections of the Competency Profiles.
- Review individual and group performance to evaluate teaching effectiveness. Adjust scope, sequence, or instructional methods for additional lessons as required.

REQUIRED RESOURCES

The items marked with an asterisk are included in the Instructor's Resource Package.

Publications

- Bliss, Timm J., and Clement E. Ward. *Seasonal Prices for Cattle and Feedgrains*. OSU Extension Facts No. 505. Stillwater, OK: Oklahoma State University Cooperative Extension Service, 1989.

- Ward, Clement E., Joseph E. Williams, and Timm J. Bliss. *Seasonal Hog Prices and Profits*. OSU Extension Facts No. 508. Stillwater, OK: Oklahoma State University Cooperative Extension Service, 1989.

OPTIONAL RESOURCES

Publications

- *Measuring Learning and Competency Gains: The Pretest/Posttest Approach*. Stillwater, OK: CIMC, Oklahoma Department of Vocational and Technical Education, 1992. For ordering information call 800-522-5810.

- OSU Extension Publications. Stillwater, OK: Oklahoma State University Cooperative Extension Service (F = Fact Sheet, CR = Current Report)

  - F-488, *Meat Trends: Consumption, Prices, and Production Costs*
  - F-497, *Price Spreads for Beef and Pork*
  - F-506, *Seasonal Cattle Feeding Profits*
  - F-511, *A Profile of Food Consumption Trends and Changing Market Institutions*
  - F-521, *Cattle Marketing Plan*
  - CR-507, *U.S. Meat and Poultry Demand*
  - CR-528, *Beef By-Product Values: Trends and Current Issues*

- USDA publications relating to livestock price trends and cycles

UNIT REFERENCES

Publications

- Anderson, Kim B. *Marketing Beef in Oklahoma: A Home Study Course*. Stillwater, OK: Oklahoma State University, 1989.
- Barrick, R. Kirby, and Hobart L. Harmon. *Animal Production and Management*. New York: McGraw-Hill, 1988.
- Bliss, Timm J. and Clement E. Ward. *Seasonal Prices for Cattle and Feedgrains*. OSU Extension Facts No. 505. Stillwater, OK: Oklahoma State University Cooperative Extension Service, 1989.
- Ensminger, M.E. *Animal Science Digest*. Danville, IL: Interstate Publishers, Inc., 1991.
- Gillespie, James R. *Modern Livestock & Poultry Production* (4th ed.). Delmar Publisher, Inc., 1992.
- *Meat and Poultry Processing*. Stillwater, OK: CIMC, Oklahoma Department of Vocational and Technical Education, 1992.
- Price, David P. *Modern Agriculture: Science, Finance, Production and Economics*. University Park, NM: SWI Publishing, 1989.
- Ward, Clement E., Joseph E. Williams, and Timm J. Bliss. *Seasonal Hog Prices and Profits*. OSU Extension Facts No. 508. Stillwater, OK: Oklahoma State University Cooperative Extension Service, 1989.

ANSWERS

LIVESTOCK PRICE TRENDS AND CYCLES

D-4

ASSIGNMENT SHEETS

OBJECTIVE 5

Assignment Sheet 1

Student answers will vary. Students should compile a chart showing the information. This project may be completed as a group or class project.

OBJECTIVE 6

Assignment Sheet 2

Student answers will vary. Students should respond to each question.

WRITTEN TEST

OBJECTIVE 1

1. B
2. B
3. D
4. D
5. A
6. B
7. C
8. B
9. D
10. C

OBJECTIVE 2

1. The quantity of a specific product purchased at a given price and time.
2. Consumers will purchase a significant difference in the amount of the product, either more or less, when the price changes.
3. Consumer do not significantly vary their purchases of the product when the price changes.

4. The demand curve can shift because of consumer's changing attitudes, changes in the availability or price of competing products, or reductions in personal income.

5. The quantity of a specific product sold, at a given price and time.

6. The equilibrium price

7. • Many agricultural products have high fixed costs and, as a result, producers may be more willing to sell their products at a lower price and even below cost.

   • Government-sponsored programs for certain commodities

   • Government regulations

OBJECTIVE 3

1, 2, 3, 5, 7, 8, 10

OBJECTIVE 4

1. I
2. H
3. I
4. G
5. G
6. H
7. J
8. K
9. K
10. J
11. A
12. F
13. E
14. F
15. A
16. E
17. B
18. D
19. B
20. C
21. D
22. C

OBJECTIVE 5

Evaluated on Assignment Sheet 1.

OBJECTIVE 6	**Evaluated on Assignment Sheet 2.**
OBJECTIVE 7	2, 3, 5

CIMC
TEST CODE SHEET

VOCATIONAL PROGRAM (BOOK TITLE) ANIMAL SCIENCE

UNIT NUMBER AND TITLE D-4 – LIVESTOCK PRICE TRENDS AND CYCLES

TOTAL NUMBER OF TEST QUESTIONS 54

TOTAL NUMBER OF BASIC SKILL QUESTIONS 54

OBJECTIVE NUMBER	TEST QUESTION NUMBER(S)	BASIC SKILL CODE(S)
1	1-10	U
2	1-7	W, U
3	1-10	U
4	1-22	U
5	Evaluated on Assignment Sheet 1	
6	Evaluated on Assignment Sheet 2	
7	1-5	U

Animal Science

Instructional Supplement

Reading

Science

Creative Thinking/
Problem Solving

Writing

Oral
Communication

Employability

Math

Interpersonal
or Relating

Social Studies

373

Reading Comprehension

- If students have difficulty gaining factual information:
  - Remind students that they probably read for many reasons. One of these reasons is to learn new information. The reason you have for reading helps determine the way you read.
  - Have students discuss the different techniques they use when reading. Lead the discussion so that students realize that, when they read for fun, they may read quickly; they may skim some parts and read others more carefully. Reading for facts requires more care.
  - Suggest that one technique found to be successful includes the following steps:
    - Identify in advance what it is you want to learn. Be certain that before starting to read, you have a clear understanding of what you want to accomplish. It sometimes helps to list the questions to be answered.
    - If the material to be read includes a table of contents, study it to get an understanding of how the material is organized.
    - Scan through the material noting headings, highlighted information, illustrations, etc.
    - Read the material carefully. Take notes or highlight as you read, listing or marking the information you want to learn. Note key words and ideas.
    - Study your notes/highlighted material. Ask yourself if you found all you wanted to learn. If not, read the material again or locate another source for the information.
  - Tell students that they should find a personal technique for reading to learn factual information.
- If students have difficulty analyzing cause and effect:
  - Remind students that in today's society, we often want to know why something happened. Often, if we examine what is to be done, we will be able to determine in advance the effect or result of the action. This can help us repeat successes and avoid mistakes.
  - Provide opportunities for students to practice recognizing cause-and-effect relationships by using examples and questions like the following:

- Melissa practiced many hours and won the contest. Why did Melissa win the contest? (She practiced many hours.) What was the result of practicing? (She won the contest.)

- Phillip followed the directions carefully, so the model worked perfectly. What happened because Phillip followed the directions carefully? (The model worked perfectly.) Why did the model work perfectly? (Phillip followed the directions carefully.)

- Introduce "cause-and-effect analysis." Define it as a systematic tool for looking at effects and the causes that create or contribute to them. State that cause-and-effect analysis can be used (1) to identify and verify factors which are causing a problem, or (2) to identify factors that must appear in a successful solution to a problem (effect).

- Use the following steps for presenting cause-and-effect analysis:

  - Identify the effect to be analyzed. Write it out at one end of a large sheet of paper, or on the chalkboard. (Think of the effect as the head of a fish. Cause-and-effect diagrams are also known as "fishbones," due to their shape, or Ishikawa diagrams, after their inventor.)

  - Draw a horizontal line from the effect and across the paper or chalkboard. (This line becomes the "backbone" of the fish.) From this horizontal line, draw four slanting lines connected to the main line, two above and two below. (These lines are the "major bones" of the fish.)

  - At the end of each slanting line, write the classifications for the main factors that contribute to the effect: People, Procedures, Equipment, and Environment.

  - On each slanting line ("major bone"), ask students to identify the specific factors that may be causing the effect. Write the factors on the appropriate slanting line (People, Procedures, Equipment, or Environment) and parallel to the "backbone." Instruct students to use brainstorming or other method to identify these factors.

  - From the specific factors identified, ask students to identify the most significant factor(s). Then, have students gather more information to verify the factor's causal relationship to the effect.

- After students become comfortable recognizing simple cause-and-effect relationships, have them create their own examples.

- If students have difficulty drawing conclusions:

  - Remind students that when they analyze a situation, perform a job task, or even discuss a television show or movie, they will often be asked to demonstrate understanding by telling what happened and explaining why it happened.

- Provide opportunities for students to practice drawing conclusions by describing events, such as a group of people crowded around a table that has a decorated cake with lighted candles on it, and asking them to decide what is happening. Have them explain why they reached that conclusion.

- Provide opportunities for students to practice drawing conclusions. Present students with descriptions of events, or with photographs or drawings, and ask them to describe what is happening. Ask the student(s) to support each response.

- Remind students that before they can draw conclusions, they must carefully observe what is happening and think about why it is happening. In more complex situations, it is often a good idea to take notes about possible conclusions as you work.

• If the students have difficulty making generalizations:

- Have the students define the adjective "general," as in "common," or "widespread." If necessary, use the dictionary.

- Work with students in turning the adjective "general" into a verb. Lead them to understanding that when they generalize, they are putting into action the idea that a characteristic is common or widespread.

- Give students examples of generalizations, such as:

  - Most humans have five fingers on each hand.
  - Spanish is the language of most Mexican citizens.

  Have each students give an example of a generalization.

Research and Reference

• If students have difficulty selecting useful resources:

- Review the different types of resources available to students. Have volunteers tell what kind of information can be found in each resource type. Have them discuss the types of projects on which each resource can assist.

- Help students learn how to locate each resource in libraries, resource centers, or media centers.

• If students have difficulty locating resources:

- Review the different types of resources available to students. Have volunteers tell what kind of information can be found in each resource type. Have them discuss the types of projects on which each resource can assist.

- Have students volunteer to tell how they would locate the resources discussed. (Be sure they know how to locate each resource in libraries, resource centers, or media centers.) Discuss the use of the library's card catalog or its computerized location system.

- If students have difficulty finding materials in the library:

  - Have the school librarian review use of the card catalog or computer index in the library. If possible, those students who have never visited the library, or who appear to have difficulty remembering the procedures for locating materials, should have a supervised tour.

  - Display examples of catalog cards and computer printouts with the overhead projector. Have students explain the information listed.

  - Locating materials in sources other than books; e.g.,periodicals and government documents, can sometimes be a difficult concept for students to grasp. Spend some time on this.

- If students have difficulty using standard references:

  - Review the purpose(s) of the specific reference work. Give examples of situations and the reference appropriate for each.

  - Illustrate the proper use of each reference work. Have students practice using each reference in a task-specific situation.

- If students have difficulty using in-book reference tools:
  - Identify the in-book reference tools in a specific reference work: table of contents, index, glossary, appendices, tabs, color codes, list of figures, list of tables, list of symbols, maps, "how to use this book" pages, and others.
  - Illustrate the proper use of each in-book reference tool. Have students practice using each tool in a task-specific situation.
- If students have difficulty using computer data bases:
  - Review search techniques with students.
  - Review operating procedures with students.
  - Provide troubleshooting guidelines for students. Encourage them to refer to reference booklets.
  - Review the overall concept of data basis, in general
- If students have trouble using magazines and newspapers:
  - Explain to students that there are many more types of magazines than those they commonly see in retail store checkout stands. Have them visit a bookstore and see the many types of hobby and special interest magazines available.
  - Tell students that whatever career they choose they will likely have access to magazines and other publications that will keep them abreast of news and new developments in their career field.
  - Explain to students that the local newspaper is their link to their community. Not only does it provide news and feature stories but it also provides advertisements that will help them make good consumer decisions.

Functional Reading

- If students have difficulty following written instructions:
  - Discuss the possible consequences of not following instructions precisely.
  - Review the *importance* of following written instructions. Give appropriate scenarios when written instructions are not followed or are not followed completely and correctly.
  - Discuss the *relationship* between the order of written instructions and the appropriate outcome. Emphasize the need to follow written instructions in their proper order. Use examples where the order of instructions in a sequence is critical to the outcome of the task.

- Explain to students that one of the keys to following written directions successfully is to read the directions completely before actually beginning to follow them. Doing this ensures that you will not be surprised as you work through the steps. It also gives you an opportunity to ask questions about steps you do not understand.

- Tell students that, after they have read the directions and understand what to do, they should go back to Step 1 and follow the directions step-by-step (without skipping any steps). Remind students that it is important to follow steps in order, even if they think they already know what to do.

- If students have difficulty interpreting graphics and symbols:

  - Remind students that interpreting a graphic is very similar to reading a page. Each part of the graphic or symbol has a meaning within the art.

  - Suggest that, when they have a graphic, chart, diagram, or table to interpret, they should carefully study the art and compare it to any similar pieces encountered. They should also study the key or any other information that will help in understanding the graphic.

  - Review the symbols being used. Discuss the purposes for each symbol. Discuss the importance of memorizing the symbols.

  - Discuss sample graphics and the purposes for each. Create or locate other examples of graphics and ask students to interpret them.

  - Explain the importance of correctly interpreting graphics and symbols. Describe possible consequences of incorrect interpretations.

- If students have difficulty using content area vocabulary:

  - Remind students that nearly every occupation or group uses words that have specific, specialized meanings to others in the same occupation or group. Have them name and define some content area, technical, or "slang" words with which they are familiar.

  - Explain that using content area or technical words makes it easier for people within groups or occupations to communicate ideas accurately. Remind students that often the same word may have a generic meaning to the majority of people, but a very specific meaning within an industry.

  - Review key terms and concepts, so that students hear, see, write, and say them.

  - Have students suggest ways to learn the meanings of the vocabulary specific to what they are studying. Provide opportunities for students to practice using the terminology they will need.

Language

- If students have difficulty using standard grammar, spelling, and capitalization:
  - Discuss the importance of using standard grammar and correct spelling, punctuation, and capitalization. Include the fact that it is more difficult to read and understand incorrectly-written materials, and that readers will take correctly-written materials more seriously.
  - List common errors in grammar, spelling, punctuation, and capitalization in materials written by your students. Review this list with the class or with individuals.
  - Help students to develop a checklist to use as they write, edit, and proofread. Each student can personalize his or her own checklist by adding the items that present the most problems to him or her. If spelling is a problem, suggest that the student keep a personal dictionary of frequently used or misspelled words.
  - Have students work with partners or in groups and review each others' writing. Allow time for students to discuss the comments with their partners or groups.
  - Suggest that as students write or proofread their own writing, they circle or mark places where they are unsure of the correct grammar, punctuation, capitalization, or spelling. Provide materials (English grammar/mechanics books or style guides) or class time for students to review, revise, or correct their writing.
- If students have difficulty stating ideas clearly:
  - Remind students to determine in advance the ideas they want to convey and the audience they want to reach. Audience analysis is very important in presenting ideas clearly and appropriately.

- State that audience analysis begins early, such as when students are doing their research. They must describe their intended audience and decide how to best present their ideas to that audience. Options for communicating with the audience include written reports, charts, graphs, diagrams, etc. Explain how the audience influences the way in which the information is presented (such as very simple text with pictures, for children; a great deal of background information, for people who know nothing about or very little about the subject; or, little background but more complex information, for experts).

- Have students work with a partner or in a small group. Provide time for them to share ideas with each other and make suggestions for making ideas clearer.

- Remind students that careful preplanning and the use of correct grammar, spelling, punctuation, and capitalization are especially important if their ideas are to be clearly understood by the intended audience.

Composition

- If students have difficulty using complete sentences:

  - Remind students that complete sentences should be used in all writing assignments requiring paragraphs. Discuss what makes a group of words a sentence. Have students practice recognizing complete sentences using either exercises from any grammar/language arts text or self-prepared sentence activities.

  - Have students volunteer to compose complete sentences using words or topics you suggest. Write the sentences on the board. Have other students analyze the sentences to determine if they are complete. If not, have a volunteer rewrite them as complete sentences.

  - Review the definition of "sentence fragment."

  - Ask students for the three things needed for a complete sentence: subject, verb, and complete thought.

  - Create samples of complete sentences and sentence fragments. For each sample, ask students whether each is a complete or fragmented sentence. Ask whether each sample answers the questions "who or what did something?" and "what happened?" For those samples identified as sentence fragments, ask students for one or more ways of completing the sentences. Continue until you are sure that students are comfortable with this method for determining if a sentence is complete.

- Stress the importance of using complete sentences in all "sentence or paragraph" style writing.

- If students have difficulty composing essays:
  - List the steps that students should follow when writing an essay. These steps should include the following:
    - Identify the topic and the audience.
    - Decide what you must know about the topic. Then, write the questions that, when answered, will tell you what you want to know.
    - Identify sources of information for answering your questions.
    - Take notes, using the sources identified.
    - Write the essay from your notes. Write a first draft, then edit and revise the draft by asking if it contains all of the information needed.
    - Proofread the final draft for spelling, grammar, format, and any special requirements.
    - Make sure that the essay presents ideas clearly for that audience.

- If students have difficulty constructing graphics and symbols:
  - Remind students that interpreting a graphic is very similar to reading a page. Each part of the graphic or symbol has a meaning within the art.
  - Suggest that, when they have a graphic, chart, diagram, or table to interpret, they should carefully study the art and compare it to any similar pieces encountered. They should also study the key or any other information that will help in understanding the graphic.
  - Review the symbols being used. Discuss the purposes for each symbol. Discuss the importance of memorizing the symbols.
  - Discuss sample graphics and the purposes for each. Create or locate other examples of graphics and ask students to interpret them.
  - Explain the importance of correctly interpreting graphics and symbols. Describe possible consequences of incorrect interpretations.

Research

- If students have difficulty taking notes:
  - Remind students of the importance of note-taking to the preparation of the final product. Explain that, because notes are for the student's own use, students should develop their own note-taking style. It will also be easier to prepare the final product if students take notes in their own words (instead of copying directly from the original source).
  - Have students volunteer to discuss some of their own note-taking techniques. Suggest that others may wish to experiment with some of these techniques.
- If students have difficulty using note cards:
  - Distinguish between note cards and reference cards: *Note cards* allow the writer to record all of the information needed to produce a report or essay without making multiple trips to a library or other resource center. *Reference cards* record bibliographic information about the sources used for note cards. (One reference card may be created for a number of note cards.) Describe a scenario involving the use of note cards and reference cards to produce a report or essay.
  - Identify types of information that can be recorded on *note cards*: direct quotations, paraphrases, summaries, facts and figures, statistics, and others. Define each type, if needed.
  - Identify types of information to be recorded on *reference cards*: author (first name, last name, middle initial), editor (if there is one), source title and edition, place of publication, name of publisher, date of publication, and other information (such as volume number, etc.).
  - Provide some basic guidelines for using note cards and reference cards:
    - Use small, lined index cards (such as 4"X6") in order to limit the amount of information recorded on each card. (Larger cards may not force you to limit your information.)
    - Determine the types of information required by the audience; conduct audience analysis before beginning research.
    - On each note card, note only one item of information (one quote, one fact, one paraphrase, one summary, etc.).
    - On each reference card, write the author, source name and page number. (You may have multiple note cards relating to each reference card.) This information is very important; you must credit the author for any direct quotations, paraphrases, or data used. Follow any required standard for creating bibliographies, such as the Gregg Reference Manual, the APA manual, and others.

- Use a numbering system to organize note cards and to relate them to reference cards.

Functional Writing

- If students have difficulty completing forms and records:
  - Remind students to first decide what information is being requested. Examine the structure of the forms used. This saves time by identifying the needed information so that time will not be spent on unwanted information.
  - Tell students to plan responses carefully before putting them in a final form. If the responses call for sentence or paragraph information, it is always a good idea to write the response in rough draft form, then edit, proofread, and rewrite the draft in a final form. Stress the importance of accurate, legible records.
- If students have difficulty writing letters:
  - Review basic purposes of letters: to communicate and to achieve desired results. Give examples of letters with specific purposes.
    - Discuss the different formats for letters: block, modified block, simplified, etc.
    - Review the parts of the letter.
    - Review guidelines for typing/preparing letters.
  - Refer the student to a reference book for greater detail about letters such as *The Gregg Reference Manual* and others.

Operation and Calculation

- If students have difficulty calculating with whole numbers:
  - Review basic skills in addition, subtraction, multiplication, and division.
  - Review mathematical terminology. (For example, "compare" indicates that you must subtract.)
  - Suggest the use of a calculator to check answers.
- If students have difficulty calculating with decimals:

- Show how the decimal system is based on groups of ten.
- Demonstrate how our money system is a decimal system.
- Review addition, subtraction, multiplication, and division skills using decimals. Demonstrate sample calculations.

- If students have trouble converting units of measure:
  - Define the units the students will be working with. For instance, write on the board that one cup equal eight ounces or one inch equals 2.54 centimenters.
  - Define equivilents in fractional form. Eight ounces in a cup can be written as 8oz/cup or cup/8 oz. Set up a diagonal relationship so the student can cross cancel and determine the desired unit.

Math Application

- If students have difficulty solving word problems:
  - Discuss the approach to solving word problems. Instruct students to read the information carefully, noting the key elements of the problem.
  - Solve a sample word problem similar to the problems to be solved by students.

- If students have difficulty selecting and applying mathematical formulas:
  - Review basic math formulas and math skills with the class or with individual students as necessary.
  - Remind students that basic math skills are used daily in such ways as counting change and paying for purchases. Remind them that they use basic mathematical formulas, such as addition and subtraction, to figure their wages and to balance their checkbooks.

- If students have difficulty using English and metric measures:
  - Review the metric system.
  - Provide students with conversion tables.
  - Provide students with English and metric liquid and linear measuring instruments. Have them make measurements with each system and compare the differences.

- If students have difficulty solving percent problems:
  - Discuss the approach to solving percent problems.
  - Solve a sample percent problem similar to the problems to be solved by students.

Data Analysis and Display

- If students have difficulty interpreting charts and tables:
  - Review the structure of the specific chart or table.
  - Discuss the information contained in the chart.
  - Demonstrate the proper use of the chart.
- If students have difficulty collecting/recording data:
  - Suggest that students first decide how the data will be collected and recorded. Explain that it is always best to come prepared with pencil or pen and a preplanned sheet for recording the specific data that will be collected. This preparation allows you to devote careful attention to your work.
  - Stress the importance of accuracy in recording data. Review any appropriate symbols, abbreviations, and other tools.
- If students have difficulty applying principles of probability:
  - Review the probability formula
    $$p = \frac{\text{number of ways the event can occur}}{\text{number of events possible}}$$
  - Using playing cards, dice, coins, or other groups of things, have students calculate p, using the formula.
  - Discuss ratios. Convert the fractions arrived at when the students calculated p into ratios.
  - Practice converting probabilities into proportions and percentages.
- If students have difficulty construction charts and tables:
  - Explain that charts and tables are merely convenient ways of grouping related information for easier reference.
  - Display charts such as maps or tables such as multiplication or chemical elements tables and ask students to supply you with certain information from the charts or maps.

- Supply the students with information from a table such as a metric conversion table or a TV schedule that has been scrambled. Have them arrange the information into a table.

- Provide students with blank maps and hypothetical information such a weather and have them place the information on the map.

Functional Math

- If students have difficulty solving practical problems:

  - Review the problem-solving procedure associated with the problems they have been assigned.

  - Walk them through a practice problem.

  - Explain the importance of solving problems correctly and the consequences for solving the problems incorrectly.

  - Explain how the students' assignments fit into "the big picture" of the assignment and/or of the objectives of the unit.

- If the student has difficulty solving income/expense problems:

  - Define the terms **income** and **expenses**. Compare these terms to **debit** and **credit**. For example, a paycheck deposited into a personal checking account is a debit (income); a check written to pay for something is a credit (expense).

  - Create a variety of word problems/scenarios where the student earns a specific wage per hour and works a specific number of hours per week or month. Require the student to calculate the income for the period (without accounting for taxes). then, provide a list of typical expenses, such as rent, car payment, food, utilities, etc. Have the student deduct the expenses from the income calculated. Remind the student that you **add** income and **subtract** expenses.

- If students have difficulty using a computer for computation:

  - Review the computer program being used.

  - Review the keyboard.

  - Demonstrate the correct steps for computation using the computer.

  - Pair students with a knowledgeable partner.

  - Discuss the importance of being "computer literate" in obtaining and keeping a job.

- If students have trouble using computer spreadsheets:
  - Review the basic mathematical operations of adding, subtracting, multiplying, and dividing.
  - Explain that spreadsheets perform a specific series of functions. Use as an example balancing a checkbook. or averaging test scores.

General Science

- If students have difficulty using scientific instruments (litmus paper):
  - Discuss, demonstrate, and review the procedures. Provide more opportunities for students to practice using litmus paper.

Life Science

- If students have difficulty investigating/applying the principle of genetics/heredity:
  - Review the reasons we study genetics and heredity.
  - Review the principles important to the specific assignment.
  - Break the assignments into smaller portions and evaluate performance often.
- If students have difficulty investigating/applying the principles of anatomy/physiology (terminology):
  - Remind students that it is important in any area of work or study to have consistent ideas or principles. Apply this concept to directions such as left/right or north, south, east, and west. Discuss how hard it would be to give directions without these consistent terms.
- If students have difficulty investigating health issues:
  - Review the issues relevant to the specific assignment.
  - Explain the reasons for investigating the particular issues and why they are important to the students.

- Provide practice assignments.
- Break the assignments into smaller sections and evaluate performance frequently.

Oral Presentation

- If students have difficulty making informative presentations:
  - Emphasize the value of carefully plan what students want to say and how they want to say it.
  - Name an audience and a topic. Have students discuss ways to make an informative presentation to the audience about a given topic. Have them think about ways of relating the topic to the audience. Ask them how they would change the presentation if the audience were different.
  - Remind students that visual or audio materials sometimes help make presentations more informative and easier to understand.
- If students have difficulty using good speaking techniques:
  - Demonstrate good speaking techniques: speak in a voice loud enough to be heard, but not loud enough to be offensive.
  - Suggest that students practice before doing the actual presenting. Practicing in front of a mirror helps many presenters.
  - Discuss the importance of knowing their data so that the speech is smooth, without long pauses or frequent "uh's." Remind students to stress important facts by slowing down or speaking louder. It is also good to repeat or summarize important points.
- If students have difficulty using effective body language:
  - Remind students that sometimes body language says as much as, or more than, the words used. Have them discuss or demonstrate their knowledge of body language.
  - Discuss the importance of conveying the appropriate message when making oral presentations. Have a volunteer demonstrate body language that says "I am confident; I know what I'm talking about and should be listened to."
  - Discuss how body language is used in skits and in mime to convey the appropriate meaning.

- If students have trouble presenting an appropriate appearance:
  - Remind students that their appearance will have an effect on the overall perception of their presentation and that a professional appearance conveys the message of competence and confidence.
  - Ask students how they would view a person speaking on "dressing for success" who wore a ragged shirt, dirty jeans, and old tennis shoes.
  - Remind students that in the business world, they will probably be required to wear professional dress when making presentations.
- If students have difficulty integrating audio and/or visual materials in oral presentations:
  - Explain that audiovisual materials should support and reinforce the organization and content of an oral report.
  - Give examples of audiovisual materials and instances in which each could be used effectively.
  - Review some basic guidelines for using audiovisual materials:
    - Use the appropriate materials for the purpose.
    - Be familiar with each item used.
    - Use audiovisual materials to support and reinforce the organization and content of the report.
    - Avoid using too many audiovisual materials.
    - Fit the materials naturally into the presentation.
    - Prepare high-quality audiovisual materials.

Cognitive Activities

- If students have difficulty collecting/recording information:
  - Suggest that they first decide how and where the information will be collected and recorded. It is also very helpful to identify how the information will be used. Explain that it is always best to come prepared with pencil or pen and a preplanned sheet for recording the specific information to be collected. This preparation allows you to devote careful attention to your work.
  - Research and outline for students the steps in using any of the following "tools" for collecting/recording information: brainstorming, brainwriting, checksheets, interviewing, and surveying.
- If students have difficulty identifying critical elements/issues:
  - Instruct students to read or examine their sources carefully, noting key words and ideas.
  - Suggest they list the questions they hope to answer.
- If students have difficulty analyzing/synthesizing information:
  - Define the terms "analyze" and "synthesize." Compare and contrast their meanings.
  - Remind them that to analyze they must break the information down into all its component parts in order to understand it.
  - Remind them that to synthesize information they should put all the component parts together in a way that makes the information usable.
  - Explain that it is usually necessary to learn about complex items or things by examining their make-up or parts, such as studying body structure by examining each individual system or studying auto mechanics by examining the different automobile systems.
  - Also explain that it is sometimes necessary to then study the whole item or thing by studying how the parts work together to make the whole item work. This examination helps us identify and compare the relationships the parts have with each other.

- Help the students understand the concepts by asking what they would do if they turned on a light and nothing happened. Lead them to discuss that they would probably first check to see if the light was plugged in or if the bulb was burned out. Plugging it in or replacing the light bulb might make the light come back on.

- Then ask the students what they would do if the light still didn't work. Lead them to the conclusion that they should check to see if all the electricity was off. If it is, they will have to think about what they know about the whole electrical system—what are its parts. Identifying the parts of the whole will help them identify the problem.

- If students have difficulty drawing conclusions:

  - Remind students that when they conduct an experiment, perform a job task, or discuss a subject, they will often be asked to draw conclusions. Give examples of such situations.

  - Explain that, before conclusions can be drawn, students must first observe carefully what is happening and why it may be happening. Suggest that, with complex experiments, a good set of notes taken while conducting the experiment can help in drawing conclusions.

  - Have students practice drawing conclusions. When possible, choose situations appropriate for the occupation or subject (such as an actual experiment, etc.). Or, use a general situation using photographs or a videotape without the volume. Ask students to state what is happening in each picture (their conclusion). Have students support their conclusions.

- If students have difficulty predicting results/outcomes:

  - Remind them to carefully examine what has already happened before deciding what will happen. Explain that they will use what they already know when predicting results or outcomes. To provide practice, ask questions such as what will happen if water is left running in the bathtub. The students might enjoy making up situations for the other students to predict.

- If students have difficulty identifying/evaluating consequences:

  - Have students define and give examples of consequences. Explain that every action has consequences.

  - Discuss the reasons for evaluating consequences. Lead students to discover that evaluating consequences determines, to a large extent, whether or not we will take action, or in what manner we will take it.

- If students have difficulty identifying/developing alternatives:
  - Look at the original item/solution requiring an alternative. Identify for students the criteria in the original that must also be met by any alternative.
  - Discuss the variables that could be changed to create an alternative.
  - To identify/develop alternatives, discuss the characteristics of an alternative. Ask which factors in the problem or situation create the opportunity for more than one possible choice. Have students brainstorm alternatives to a sample problem or situation that you create.
- If students have difficulty evaluating an alternative:
  - To evaluate alternatives, suggest that students begin by listing the criteria which must be met by any alternative. Then, they can judge potential alternatives in terms of the criteria.
- If students have difficulty creating a finished product:
  - Have them to go back to the beginning and reidentify what it was they wanted to accomplish. Have them ask themselves how they intended to accomplish this and why it has been difficult to accomplish. Have them decide if their original idea is "do-able" or if they should decide on a new final product that they will be able to complete.
  - Be sure that the students realize that one of the most important aspects of creating a finished product is the planning of the desired finished product.
- If students have difficulty transferring knowledge/training to new situations:
  - Remind the students that everything they do makes use of information that they already know. Tell them that this process of using known information often happens subconsciously. When you identify an animal as a dog, you use already known information—you know what dogs look and act like so you can recognize a dog.
  - Tell the students that when they encounter a situation or a question they aren't familiar with, they should examine it carefully to identify what they already know that will help them solve the problem or answer the question. For practice, use examples such as the following:
  - A baby you are caring for starts crying. You don't know why, but you do want to make her stop. How do you know what to try? Begin by thinking carefully about what you know about why babies cry. (hungry, diaper needs changing, wants attention, sick) Identifying what you already know gives you ideas to try that might make the baby stop crying.

- Remind the students that when trying to solve a problem or answer a question, they should always identify what they know by thinking about similar situations, problems, or questions they have faced. This will help them with find the answer.

- If students have difficulty applying new technology:

  - Discuss the evolution of the new technology. Assist students in determining how the new technology relates to previous procedures/ materials with which they are familiar. This should help them make the step from the old to the new.

  - If possible, have an expert in the new technology speak to the class.

  - If applicable, divide the class into two groups. Have one group apply the old technology, and the other apply the new. Discuss the benefits of the new technology.

- If students have difficulty developing an action plan:

  - Define an "action plan." An action plan assigns specific tasks to individuals or groups and states the date on which these tasks must be completed.

  - State the purposes of action plans. Encourage students to write these points down for reference:

    - They set up logical steps for accomplishing objectives.
    - They show achievement milestones.
    - They assign ownership to individuals and empower them.
    - They provide a basis for cooperation and recognition.
    - They describe how resources will be distributed.

  - Research and outline for students the steps in using any of the following "tools" for planning actions: flowcharts, PERT charts, and Gantt charts.

Job Acquisition/Development

- If students have difficulty mastering specific job task/procedure:
  - Discuss the importance of mastering specific job tasks or procedures. Explain that it is probably impossible to find a job where there isn't a task or procedure to be mastered. Remind them that future employers will be more likely to hire people who can already perform the tasks required.
  - Ask the students to share methods they have used to master specific job tasks or procedures. Discuss these methods with the class.
  - Emphasize the fact that practice makes a person proficient and proficiency makes a person confident.
  - Suggest they study each component of the procedure to determine which area is causing difficulty.
  - Review the entire procedure.
  - Team them with proficient students or professionals to practice the procedure.
- If students have difficulty practicing good work habits/attitudes:
  - Remind the students that future employers are looking for people with good work habits. Have the students list what they think are good work habits. Discuss each suggestion as it is named. Have them identify ways to improve work habits.
  - Distinguish between habits and attitudes. Demonstrate how it is possible to have good work habits, but a poor attitude.
  - Explain the role of good work habits and attitudes in obtaining and retaining employment.
  - Distinguish between good and poor work habits and attitudes. Give examples.
  - Discuss the employer's expectations of the student on the job.

Animal Science

Instructor's Resource Package

LAP Sheets

Transparency Masters

Written Tests

Handouts

Developed by the
Curriculum and Instructional Materials Center
for the Division of Agricultural Education
Oklahoma Department of Vocational and Technical Education

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LAP SHEET	SAFETY	A-1

Name _____ Score _____

Check the blank as you complete each step.

1. Take	___ the pretest provided by your instructor. Have your instructor evaluate your completed test. After your test has been evaluated, follow your instructor's recommendations.
2. Read	___ the introduction, unit objective, and specific objectives.
3. Do	___ the focus assignments.
4. Stop	___ and have your instructor evaluate your work from the focus assignment. After your work has been evaluated, follow your instructor's recommendations.
5. Study	___ the Information Sheet, objective 1.
Optional: Write	___ to OSHA and ask for safety information.
Optional: Ask	___ your instructor to display and demonstrate safety equipment.
Optional: Watch	___ a video on safety.
6. Study	___ the Information Sheet, objective 2.
Optional: Visit	___ a poultry production facility to see the level of automation.
Optional: Watch	___ a video on trends in animal science.
7. Do	___ Assignment Sheet 1.

May be photocopied for student use.

8. **Stop**	___	and have your instructor evaluate your work from the Assignment Sheet. After your work has been evaluated, follow your instructor's recommendations.
9. **Study**	___	the Information Sheet, objective 4.
Optional: **Watch**	___	a video on working livestock.
Optional: **Share**	___	and encourage students to share personal experiences involving safety and accidents when working with livestock.
Optional: **Visit**	___	a livestock facility and discuss safe operating procedures.
10. **Study**	___	the Information Sheet, objective 5.
Optional: **Visit**	___	facilities to review safety procedures and precautions.
11. **Study**	___	the Information Sheet, objective 6.
Optional: **Watch**	___	a video on safety precautions for equipment.
Optional: **Talk**	___	with an electrician about electrical safety.
12. **Ask**	___	your instructor to arrange a field trip to an animal production operation.
13. **Do**	___	Assignment Sheet 2.
14. **Stop**	___	and have your instructor evaluate your work from the Assignment Sheet. After your work has been evaluated, follow your instructor's recommendations.
15. **Study**	___	the Information Sheet, objective 8.
Optional: **Watch**	___	a video on animal behavior.

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Optional: Visit	___	a livestock auction facility to observe how livestock are moved from trucks to the auction block.
Optional: Talk	___	with stock managers who control cattle, sheep, and sows about the similarities and differences in behavior.
16. Study	___	the Information Sheet, objective 9.
Optional: Talk	___	with a doctor about injuries and injury prevention.
17. Do	___	Assignment Sheet 3.
18. Stop	___	and have your instructor evaluate your work from the Assignment Sheet. After your work has been evaluated, follow your instructor's recommendations.
19. Study	___	the Information Sheet, objective 11.
Optional: Talk	___	with a doctor, veterinarian, or other medical professional about zoonoses and prevention.
20. Study	___	the Information Sheet, objective 12.
Optional: Identify	___	current issues regarding hormone use.
21. Take	___	the posttest provided by your instructor. Have your instructor evaluate your completed test. After your test has been evaluated, follow your instructor's recommendations.

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WRITTEN TEST

SAFETY A-1

Name _____ Score _____

OBJECTIVE 1

Choose the word or phrase to complete statements about safety in the animal science industry. Write the letter of the correct answer in the blank.

____ 1. The group with the highest accident rate is people

A. younger than 25
B. older than 65
C. older than 25 and younger than 65
D. younger than 25 and older than 65

____ 2. Accidents are usually caused by

A. old machines
B. human error
C. improper maintenance
D. being tired

____ 3. All of the following are causes of accidents EXCEPT

A. poor judgement
B. stress
C. working with others
D. rushing to get a job done

____ 4. Accidents and injuries can be reduced by following proper procedures, wearing leather shoes with steel toes, and

A. wearing bright colors
B. avoiding work after dark
C. warming up machines before use
D. servicing machines according to manufacturer's recommendation

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____ 5. Federal law requires that employers provide

A. a safe and healthy work place
B. a rest station for tired workers
C. operating instructions for equipment and machines
D. safety equipment, such as steel-toed boots

____ 6. First-aid kits and fire extinguishers should be

A. located under the seat of all machines
B. carried by farm managers
C. next to the phone
D. readily available

OBJECTIVE 2

Choose the word or phrase to complete statements about trends in animal science. Write the letter of the correct answer in the blank.

____ 1. Agriculture employs

A. less than 10% of the work force
B. about 30% of the work force
C. about 20% of the work force
D. over 40% of the work force

____ 2. Agriculture employs people in

A. producing farm products
B. supplying fertilizers
C. selling farm products
D. all of the above

____ 3. Improved animal productivity and reduced loss due to illness and death can be attributed to

A. advances in animal science research
B. greater understanding of genetics
C. improved veterinary procedures
D. greater use of machines

____ 4. Machines have

A. had little impact on animal science
B. made animal science more expensive
C. made animal science more efficient
D. doubled the rate of injury

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____ 5. A genetic engineer might

A. study the effects that environment has on livestock
B. analyze the ingredients in feeds
C. inject reproductive cells from one animal to another
D. research how to improve processing efficiency

____ 6. One of the first attempts in selecting and breeding was with

A. horses
B. cattle
C. poultry
D. swine

____ 7. By the year 2000, the number of swine producers is expected to

A. increase
B. decrease
C. fluctuate
C. remain about the same

OBJECTIVE 3

Evaluated on Assignment Sheet 1.

OBJECTIVE 4

State safety factors to observe in working livestock. State ten factors to observe in working livestock. Write your answer in the blanks.

_____

_____

_____

_____

_____

_____

_____

_____

May be photocopied for student use.

OBJECTIVE 5

Select factors affecting facility safety. Write the letter of the correct answer in the blank.

____ 1. Children and visitors who visit a livestock facility should be

A. equipped with respirators
B. kept out of animal quarters
C. kept 50 feet away from livestock
D. allowed to remain in livestock area for no more than 30 minutes

____ 2. Latches

A. should allow easy exit
B. should be made of stainless steel
C. should open inward
D. should be strong to prevent premature opening

____ 3. Respirators should be used

A. when handling grain
B. at the first sign of fire
C. when inspecting livestock facilities
D. at all times

____ 4. All of the following are factors affecting livestock facility safety **EXCEPT**

A. keep clean and orderly
B. use solid pens and straight chutes
C. keep doors and gates closed
D. use proper ventilation

____ 5. The system or systems that should be inspected regularly is/are

A. water
B. fire
C. ventilation
D. all of the above

May be photocopied for student use.

____ 6. Training is essential for

A. everyone who works in livestock facilities
B. the managers of livestock facilities
C. the owners of livestock facilities
D. children who visit livestock facilities

OBJECTIVE 6

State safety precautions for equipment. Write your answer in the blanks.

1. State ten maintenance and safety precautions.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

2. State five storage precautions.

_____

_____

_____

_____

_____

_____

May be photocopied for student use.

OBJECTIVE 7

Evaluated on Assignment Sheet 2.

OBJECTIVE 8

Analyze case studies for behavioral factors that affect livestock handling. Write your answers in the blanks.

1. Anne is preparing to load some cattle and sheep into two separate trucks. She first loads the sheep using a ramp with a 24-degree incline. She uses the same ramp for the cattle because she's in a hurry. What will happen when the cattle are loaded? What should she have done?

_____

_____

_____

_____

2. Jimmy, a pig farmer, wants to check the recently born piglets that are nursing. What procedure should he use for checking the piglets and why?

_____

_____

_____

3. Sarah wants to ship some cattle. She's heard that if you don't feed your cattle for several days before shipping, they'll be calm and much easier to load. What's wrong with this advice?

_____

_____

_____

4. Frank Jr. is excited because he did well on his math exam. He runs into the barn and yells the good news to his father. He's surprised when he gets a whipping. Why is his father upset?

_____

_____

_____

May be photocopied for student use.

5. Sammy, a boar, reacts wildly when Shauna approaches him with a stick. "Every time I come in here, I've got to use this stick to move this boar," Shauna says, as she approaches the pig. Why does the pig react the way it does?

_____

_____

_____

6. Jose wants to herd six sheep towards the shearing station. He is surprised when the two sheep he has trapped against the fence bolt to join the other four sheep. What two behaviors should he keep in mind to make his job easier?

_____

_____

_____

7. Bobby's classmates come to visit his father's sheep ranch. A little girl walked slowly into the herd, holding out her hand to pet the sheep. What did the sheep do and why?

_____

_____

_____

_____

OBJECTIVE 9

List common livestock-handling injuries and their causes. List six common injuries and their causes.

_____

_____

_____

_____

_____

May be photocopied for student use.

OBJECTIVE 10

Evaluated on Assignment Sheet 3.

OBJECTIVE 11

Choose the word or phrase to complete statements about hazards of animal diseases. Write the letter of the correct answer in the blank.

____ 1. An acute, infectious, often fatal viral disease that attacks the nervous system is

A. brucellosis
B. trichinosis
C. salmonellosis
D. rabies

____ 2. Any of a number of bacteria causing a wide range of symptoms, including death, is

A. rabies
B. ringworm
C. salmonellosis
D. spotted fever

____ 3. A fungal disease that results in an itchy patch on the skin is

A. tapeworm
B. ringworm
C. brucellosis
D. swine erysipelas

____ 4. A bacterial infection that causes an influenza-like illness and is transmitted through urine from an infected cow is

A. leptospirosis
B. tuberculosis
C. brucellosis
D. rabies

May be photocopied for student use.

____ 5. Infectious diseases transmitted by ticks and mites are

A. brucellosis and salmonella
B. salmonella and rabies
C. spotted fever and Lyme's disease
D. swine erysipelas and leptospirosis

____ 6. A disease characterized by the formation of small nodules containing pus or dry yellowish cheesy material that is generally transmitted by the respiratory system is

A. tuberculosis
B. brucellosis
C. salmonellosis
D. leptospirosis

____ 7. Techniques to prevent zoonoses include wearing rubber gloves when attending sick animals, maintaining a preventative vaccination program, and

A. washing your hands thoroughly in cold water
B. keeping carcasses to monitor decay
C. examining wild animals to detect illnesses
D. quarantining sick animals

____ 8. Proper housing and ventilating, proper pasture rotation, and proper manure disposal are examples of ways to

A. maintain a clean and healthy environment
B. eliminate zoonoses
C. avoid contact with infected animals
D. prevent rabies

OBJECTIVE 12

Discuss the impact of hormone use on animal and public safety. Write your answers in the blanks.

1. What is an advantage of using hormones in livestock operations?

_____

_____

_____

May be photocopied for student use.

2. Describe how the bovine somatotropin (BST) affects cows.

3. What government agency has to approve the use of hormones in agriculture?

4. Why is there a ban on the use of diethylstilbestrol (DES)?

5. David, a farmer, is in the hospital because of a tractor accident. He asks his new farmhand to add hormone additives to the feed. Explain why this is a bad idea.

6. Why are feed additives an important aspect of modern agriculture?

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LAP SHEET	CAREERS	A-2

Check the blank as you complete each step.

1. Take	___ the pretest provided by your instructor. Have your instructor evaluate your completed test. After your test has been evaluated, follow your instructor's recommendations.
2. Read	___ the introduction, unit objective, and specific objectives.
3. Do	___ the focus assignments.
4. Stop	___ and have your instructor evaluate your work from the focus assignment. After your work has been evaluated, follow your instructor's recommendations.
5. Study	___ the Information Sheet, objective 1.
Optional: Talk	___ with a career counselor about career selection.
Optional: Complete	___ an interest inventory.
Optional: Watch	___ a video on careers.
6. Do	___ Assignment Sheet 1.
7. Ask	___ your instructor for two college catalogs that offer degrees in animal science.
8. Stop	___ and have your instructor evaluate your work from the Assignment Sheet. After your work has been evaluated, follow your instructor's recommendations.
9. Do	___ Assignment Sheet 2.
10. Stop	___ and have your instructor evaluate your work from the Assignment Sheet. After your work has been evaluated, follow your instructor's recommendations.

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11. **Study**	___	the Information Sheet, objective 4.
12. **Ask**	___	your instructor for Handout 1.
Optional: Talk	___	with individuals about their animal science careers.
13. **Study**	___	the Information Sheet, objective 5.
Optional: Talk	___	with industry and government recruiters about requirements for a career in animal science.
14. **Do**	___	Assignment Sheet 3.
15. **Ask**	___	your instructor to approve your interviewee choice.
16. **Ask**	___	your instructor to approve your ten (or more) interview questions.
17. **Ask**	___	your instructor for Handout 2.
18. **Ask**	___	your instructor to approve your thank-you letter.
19. **Stop**	___	and have your instructor evaluate your work from the Assignment Sheet. After your work has been evaluated, follow your instructor's recommendations.
20. **Study**	___	the Information Sheet, objective 7.
21. **Ask**	___	your instructor for Handout 3.
Optional: Write	___	a letter to a public or private organization requesting information about job opportunities.
22. **Do**	___	Assignment Sheet 4.
23. **Ask**	___	your instructor for a copy of the local yellow pages.
24. **Stop**	___	and have your instructor evaluate your work from the Assignment Sheet. After your work has been evaluated, follow your instructor's recommendations.
25. **Do**	___	Assignment Sheet 5.
26. **Ask**	___	your instructor for Handouts 4 and 5.

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27. **Stop** ___ and have your instructor evaluate your work from the Assignment Sheet. After your work has been evaluated, follow your instructor's recommendations.

28. **Do** ___ Assignment Sheet 6.

Optional:
Ask ___ your instructor to demonstrate presentation skills.

29. **Take** ___ the posttest provided by your instructor. Have your instructor evaluate your completed test. After your test has been evaluated, follow your instructor's recommendations.

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WRITTEN TEST

CAREERS A-2

Name _____ Score _____

OBJECTIVE 1

Discuss employment opportunities at various education levels. Write your answers in the blanks.

1. What type of position would you expect to get with a high school education?

   _____

2. What are three clubs and organizations where you can get related experience?

   _____

   _____

   _____

3. What were the 1990 average annual starting salaries for the following education levels?

   a. Bachelor of Science _____

   b. Master of Science _____

   c. Doctor of Philosophy _____

4. What are four benefits of a career in animal science?

   _____

   _____

   _____

   _____

   _____

   _____

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5. The largest proportion of four-year college graduates enter what post-graduation activity?

_____

6. What are three ways of gaining work experience?

_____

_____

_____

7. What are five things you should do when choosing a career?

_____

_____

_____

_____

_____

OBJECTIVE 2 **Evaluated on Assignment Sheet 1.**

OBJECTIVE 3 **Evaluated on Assignment Sheet 2.**

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OBJECTIVE 4

Match areas of study/specialization in animal science required for a specific project to their descriptions. Write the letter of the correct answer in the blank.

A. science	E. food industry	I. marketing
B. international	F. agriscience	J. education
C. agribusiness	G. private sector	K. agricultural sales
D. production	H. public sector	

____ 1. Careers requiring a strong education in the scientific method, chemistry, nutrition, physiology, biology, and communication. Research has increased profits and efficiency and improved animal health, reproduction, and nutrition.

____ 2. Offers many opportunities in processing, packaging, and distributing food that is nutritious, safe, convenient, attractive, and economical. Careers require a basic knowledge of livestock along with comprehension of marketing, advertising, sales, processing, economics, and computer science.

____ 3. Careers requiring a foundation knowledge of agriculture in addition to economics, business, banking, trade, and language.

____ 4. The foundation of the animal science industry, with careers requiring solid knowledge of livestock, health and nutrition, behavior, development, and business studies (such as economics, costing, and pricing).

____ 5. Hire employees with degrees in animal science, for extension services, inspection services, research, conservation, and many more.

____ 6. Careers requiring basic knowledge of livestock along with comprehension and skills in business, advertising, economics, computer science, and effective communication.

____ 7. Careers requiring a broad knowledge of agriculture, teaching skills, and a commitment to helping young people learn and develop.

____ 8. Careers requiring a basic knowledge of agriculture and a desire to be of service, with skills in sales, business, marketing, advertising, computer use, and effective communication.

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OBJECTIVE 5

State requirements for a career in animal science. Write your answers in the blanks.

1. State the following requirements for a career in animal science.

   a. scientific background

   _____

   _____

   b. practical skills

   _____

   _____

   c. communication

   _____

   _____

   d. dedication

   _____

   _____

   e. dependability (state four characteristics)

   _____

   _____

   _____

   _____

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f. professionalism (state four characteristics)

_____

_____

_____

_____

_____

2. State seven skills necessary for gaining employment.

_____

_____

_____

_____

_____

_____

_____

_____

OBJECTIVE 6

Evaluated on Assignment Sheet 3.

OBJECTIVE 7

Select true statements about organizations that employ people trained in animal science. Write an "X" in the blank before each correct answer.

____ 1. Federal policies and laws govern many of the steps from production to consumption.

____ 2. State agencies offer technical assistance and are involved in inspection, research, education, and enforcement of state laws related to agriculture.

____ 3. Salary for state and federal positions is determined by the supply and demand for college graduates.

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____ 4. Private institutions hire only individuals with advanced degrees in animal science.

____ 5. Research is necessary to find a position that is available and fits your interests, career goals, and skills.

____ 6. Salaries depend on education and experience.

OBJECTIVE 8 **Evaluated on Assignment Sheet 4.**

OBJECTIVE 9 **Evaluated on Assignment Sheet 5.**

OBJECTIVE 10 **Evaluated on Assignment Sheet 6.**

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Food Inspector
Qualifications Information Statement

GS-1863-5 and 7

Open continuously. Certain locations and grades may close periodically. Amendments to this announcement will be available in Federal Job Centers, when locations or grades are closed.

☞ **NOTE:** Similar pamphlets are available from the USDA and Federal Job Centers for many USDA positions.

Description of Work

Food Inspectors in the Federal Government inspect the slaughter and processing of food animals in privately-owned meat or poultry slaughter and processing plants. They ensure that the product is fit for human consumption in compliance with Federal laws governing the wholesomeness and purity of meat and poultry products. This is accomplished through ante-mortem inspection involving a visual examination of the live animal or poultry prior to slaughter and post-mortem inspection to determine that the product is not contaminated and that sanitation procedures are maintained.

Processing Food Inspectors inspect processed meat and poultry products and all other ingredients contained in the final product. These include frozen dinners, canned goods, and cured and smoked products.

Federal Food Inspectors work in highly mechanized plant environments near operating machinery with moving parts; with poultry or livestock in confined areas; in extreme temperatures, and on slippery floors. The duties often require working with sharp knives, hands in water, moderate lifting, and walking or standing for long periods.

As a Federal Food Inspector, you will be working in an ever-changing environment. Also, as a Federal official, you will be required to uphold the integrity of the regulatory process. You will acquire the skills necessary to balance the industry's desire for productivity against the public's right to protection against unsafe or inferior food products.

Location of Positions

The primary employer of Federal Inspectors is the U.S. Department of Agriculture's Food Safety and Inspection Service (FSIS), employing several hundred inspectors per year. Positions are located throughout the United States and Puerto Rico, at plants ranging from small facilities to large mechanized assembly line operations. Plants are located both in large metropolitan areas, as well as in rural locations, close to animal supply sources.

In addition, the Department of Commerce occasionally employs Food Inspectors at U.S. ports for fish inspection.

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Training/Advancement

Most inspectors are trained in the slaughter inspection specialization, while the remainder specialize in processed products inspection. GS-5 level trainees perform the simpler inspection work and receive on-the-job training in the rules, regulations, techniques, and responsibilities of the position. Those assigned to slaughter inspection are trained to detect physical and behavioral abnormalities in live animals; and head, viscera, and carcass irregularities that would make products unfit for human consumption. Those specializing in processed products are trained in food sanitation and processing operations, and the theories of public health sanitation applicable to food processing.

Food Inspector positions are filled at the GS-5 or GS-7 grade levels. If you are appointed at the GS-5 level, you will be eligible for promotion to GS-7 after one year of satisfactory performance. Opportunities above GS-7 are available though competitive promotion procedures.

Qualification Requirements

TO QUALIFY FOR THE JOB, YOU MUST PASS A WRITTEN TEST WITH A MINIMUM SCORE OF 70. Information on dates and locations of written tests is in the current amendment to this announcement, available at the address at the bottom of page 4 or at Office of Personnel Management, Federal Job Information Centers.

GS-5

In addition to passing the written test, to qualify at GS-5, you must have three years of full-time experience as described below. This experience must have been obtained since your 16th birthday.

Acceptable Experience:

1. Experience with animals gained as a veterinary assistant or in field disease control.
2. Experience with livestock or poultry gained in a public stockyard; in manufacturing or preparing veterinary biological products; on a ranch, farm, or hatchery; in poultry or livestock management; or other comparable activity.
3. Experience with livestock or poultry slaughtering/processing; or in marketing or handling these products at sale points.
4. Experience in dairy, poultry, meat or other food processing settings where sanitation measures and quality controls are applied.

NOTE: Some jobs do not provide the type of experience that can be counted toward this requirement. Such jobs include laborer, guard, driver, or sales clerk positions in the activities described above. Only work directly involved with caring for animals or working with meat products will be credited.

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GS-7

To qualify at the GS-7 level, applicants must meet the requirements described above, and must have had an additional year of experience which demonstrates the following knowledge and abilities:

1. Ability to carry out complete ante- and post-mortem inspections of meat animals and poultry; or ability to carry out complete inspections of meat, poultry, and fish processing; AND,

2. Knowledge of Federal laws and regulations pertaining to fitness of animals for human consumption; or, knowledge of Federal laws and regulations pertaining to meat, poultry, and fish processing; AND,

3. Knowledge of general sanitation practices, laws, and regulations governing the food industry; AND,

4. Ability to communicate effectively with supervisors and workers in the food industry.

Substitution of Education:

Satisfactory completion of a full 4-year course of high school study which included at least two 1-year courses in biology, general science, chemistry, appropriate agricultural subjects, or an equivalent combination of these, may be substituted for 1 year of the required experience. The application form (SF-171) must contain specific information about the courses, if they are substituted for experience.

Successfully completed study beyond high school may be substituted at the rate of one year for nine months of the required experience. This study must have included an average of six semester hours (or equivalent) per year in any combination of the following: zoology, biology, chemistry, veterinary medicine, food technology, or appropriate agricultural subjects.

Basis of Rating

Applicants who pass the written test and are eligible at the GS-5 level will be ranked according to their test scores. Applicants who are eligible at the GS-7 level, who pass the written test, will be rated based on an evaluation of experience and training, described in their application and Supplemental Qualifications Statement for Food Inspector.

Physical Requirements

Applicants must be physically and mentally able to efficiently perform the job functions, without hazard to themselves or others. These positions require good vision (including color), hearing, touch, and eye-hand coordination. If the use of a prosthesis or mechanical aid satisfactorily compensates for an impaired function, then applicants may not be automatically disqualified. Some positions may require a valid state driver's license.

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Conflict of Interest Policy

The Food Safety and Inspection Service prohibits the assignment of employees to any establishment where existing circumstances might prevent impartial performance of assigned duties. Such a situation is considered a conflict of interest. The following are specifically prohibited situations:

1. An appointment to perform official inspection or related duties at an establishment where you have been employed for more than 90 days during the past 3 years.
2. An appointment to perform these duties at an establishment, tenant, or subsidiary thereof, from which you receive an annuity or pension.
3. An appointment to any establishment which employs a member of your immediate family (i.e., parent, spouse, child, or sibling) or which employs other family members living in your household. These include immediate family in-laws, stepparents, stepchildren, grandparents, and grandchildren.
4. An appointment to any establishment which employs your family member (above) in a supervisory, managerial, or policy-making capacity, even if that person does not live in your household.

How to Apply

You will need to pass the written test only once, for both the GS-5 and GS-7 level. To be scheduled for the test, complete the attached Test Scheduling Card, and submit to:

U.S. Department of Agriculture
Food Safety and Inspection Service
POB, Examining Unit
Butler Square West, 4th Floor
100 North Sixth Street
Minneapolis, MN 55403

Indicate only ONE test location in Block 5 of the application. Test Scheduling Cards must be postmarked no later than the first of the month preceding the month of the desired test. Applicants will be notified of the time and location approximately two weeks before the test is to be given. Application forms will be sent to you with the test confirmation. You must complete the forms and bring them with you to the test to be admitted. After the test, the results will be mailed to you. If you pass the test, and meet the experience and/or education requirements, your name will be placed on the List of Eligibles as discussed above. You will receive consideration for employment for a one year period, during which time the test may not be retaken.

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General Information

Special Notice: The Office of Personnel Management has no connection with any private employment agency, so-called "civil service" school, or published study guide for Food Inspector. No "civil service" school, employment agency, or publication can guarantee that you will rank high enough on a list of eligible applicants to be offered a job with the Federal Government.

Equal Employment Opportunity: All qualified applicants will receive consideration for employment without regard to race, creed, color, religion, national origin, sex, age, or other nonmerit factors.

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Guidelines for Writing a Thank-you Letter

Thank-you letters should follow written requests, personal interviews, and job interviews. They not only convey your appreciation for the time spent with you, but they also indicate that you are interested in the person or the position. Since written communications are important to all business interactions, you should know the proper form and style.

A thank-you letter should include:

- Return address – your name and address on the left or right side
- Date on the left side or in the center
- Inside address – the person's name and address on the left side
- Salutation or greeting followed by a comma if hand-written, or a colon if typed

  EXAMPLE: Dear Mr. Hendricks:

- In the body of the letter:
  - Thank the person, stating the date and purpose.
  - Mention a positive aspect of the exchange.
  - Tell how his or her cooperation helped or impressed you.
  - End with a note of positive feeling.
- Closing – Sincerely, Yours truly, etc.
- Signature, or if typed, three blank lines of signature space and your typed name underneath
- Be sure your spelling and grammar are perfect. If you're not sure, have someone proofread the letter before you sign and send it.

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J. C. Student
Rt. 1, Box 111
Agville, OK 71111
(405) 111-1111

October 11, 1994

Mr. Howard Helpful
1111 Patootie Road
Agville, OK 71111

Dear Mr. Helpful:

Thank you for taking the time to talk to me on October 7 about raising swine. It was a pleasure to meet you and to learn more about Hampshire hogs.

I was especially interested in the computer program for determining balanced rations. I hope to learn to use a similar program on our school computer.

When I made my report to the class, they were interested in hearing about your computerized record keeping. They also enjoyed knowing that you were able to make a good profit on feeder hogs last year.

I hope to have the pleasure of visiting with you again.

Sincerely,

J. C. Student

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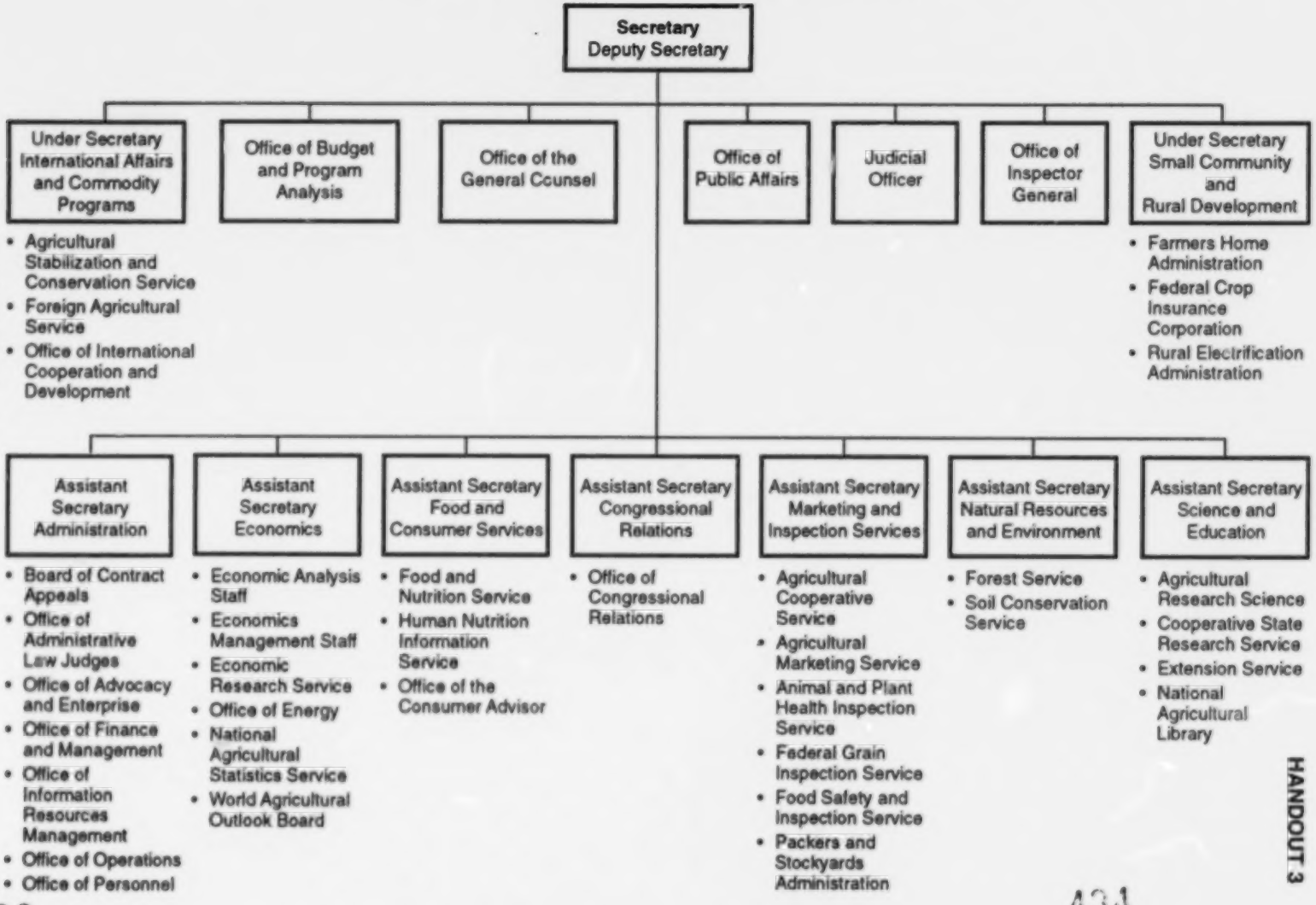
DEPARTMENT OF AGRICULTURE


Secretary
Deputy Secretary
Under Secretary International Affairs and Commodity Programs
• Agricultural Stabilization and Conservation Service
• Foreign Agricultural Service
• Office of International Cooperation and Development
Office of Budget and Program Analysis
Office of the General Ccunsel
Office of Public Affairs
Judicial Officer
Office of Inspector General
Under Secretary Small Community and Rural Development
• Farmers Home Administration
• Federal Crop Insurance Corporation
• Rural Electrification Administration
Assistant Secretary Administration
• Board of Contract Appeals
• Office of Administrative Law Judges
• Office of Advocacy and Enterprise
• Office of Finance and Management
• Office of Information Resources Management
• Office of Operations
• Office of Personnel
Assistant Secretary Economics
• Economic Analysis Staff
• Economics Management Staff
• Economic Research Service
• Office of Energy
• National Agricultural Statistics Service
• World Agricultural Outlook Board
Assistant Secretary Food and Consumer Services
• Food and Nutrition Service
• Human Nutrition Information Service
• Office of the Consumer Advisor
Assistant Secretary Congressional Relations
• Office of Congressional Relations
Assistant Secretary Marketing and Inspection Services
• Agricultural Cooperative Service
• Agricultural Marketing Service
• Animal and Plant Health Inspection Service
• Federal Grain Inspection Service
• Food Safety and Inspection Service
• Packers and Stockyards Administration
Assistant Secretary Natural Resources and Environment
• Forest Service
• Soil Conservation Service
Assistant Secretary Science and Education
• Agricultural Research Science
• Cooperative State Research Service
• Extension Service
• National Agricultural Library

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Speech Organization and Outline

CHOOSING YOUR TOPIC: Consider: *your* background, experience, and interests; your audience's background, age, interests, and beliefs; appropriateness to the assignment and to time limits

Good transitions, such as *next; second; on the other hand; if you think X is an attractive feature, you'll really like Y*, will tie your speech together, make it flow smoothly, give it focus. Transitions tell your audience how to follow your thinking, so they are able to stay with you. Build in good, solid, interesting transitions!

INTRODUCTION

I. Get attention: humor, story, startling fact or question
II. Relate to the *specific* audience: Why should *this group* be interested, want to listen?
III. Introduce the thesis statement, question, or proposition

Transition

BODY

I. Main issue
   A. support/evidence*
   B. support/evidence

Transition

II. Main issue
   A. support/evidence
   B. support/evidence

Transition

III. Main issue
   A. support/evidence
   B. support/evidence

Transition

CONCLUSION

I. Summarize
II. Relate to the *specific* audience
III. Finish with an effective conclusion that
   A. emphasizes your point, clinches it
   B. leaves the audience feeling as well as thinking the way you intend
   C. clearly marks the end of the speech

* Types of evidence and support: facts, statistics, quotes, analogy, anecdotes, logical reasoning, inference (drawing conclusions from the evidence you have presented), interviews, paraphrasing. Use good, authoritative sources. CITE YOUR SOURCES!

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Sample Speech Outline

Topic: How to fill out a job application form.

Think how choppy and boring a speech would be if you read it. *Talk with the audience* as you would with a small group of friends, explaining and giving examples as you cover each idea.

INTRODUCTION: Show a simple fast-food chain form and a complicated Federal Employment form

I. What to expect on the form

- A. 1-3 pages long
- B. Questions about education, experience, references, military service, personal goals, minority questions

II. What information you'll need

- A. Education
  1. What schools you went to and when
  2. Give examples
- B. Work history
  1. What jobs, for whom, and when
  2. Give examples
- C. Names, addresses, and phone numbers of references
- D. Some employers want to see high school records

III. How to fill in the form correctly

- A. Provide all the information asked for
  1. Write N/A for "not applicable" where needed
- B. Print neatly or type
  1. Neatness is very important – Story about how Mr. Andrews didn't a hire a student because the application was messy
  2. First impression the employer has of you
- C. Tell the truth – why lying is a bad policy
  1. It can catch up with you later and ruin your employer's faith in you
  2. Your history, records, references, and the application should match up
- D. List all experiences, abilities, and skills related to the job

  EXAMPLES: General business and math courses, FFA, president of my church youth league, helping my dad on the farm, raising rabbits and sheep, cutting firewood, planting crops, driving the tractor, running pumps and other equipment

CONCLUSION: Mr. Andrews' story about the three applications and how he made his choice. "If you do a good job on the application, it shows the employer that you can do a good job on the job."

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LAP SHEET

PRIVATE AND GOVERNMENT AGENCIES, THEIR SERVICES, AND PROGRAMS A-3

Name _____

Check the blank as you complete each step.

1. **Take**	____	the pretest provided by your instructor. Have your instructor evaluate your completed test. After your test has been evaluated, follow your instructor's recommendations.
2. **Read**	____	the introduction, unit objective, and specific objectives.
3. **Do**	____	the focus assignments.
4. **Stop**	____	and have your instructor evaluate your work from the focus assignment. After your work has been evaluated, follow your instructor's recommendations.
5. **Study**	____	the Information Sheets, objective 1.
Optional: Write	____	a report on various programs, services and departments in the USDA.
Optional: Visit	____	a local office of the USDA.
6. **Study**	____	the Information Sheets, objective 2.
7. **Watch**	____	the video "In Partnership with You."
Optional: Visit	____	a farmer's market.
Optional: Talk	____	with an ODA employee.

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Optional: Bring	____	a "Made in Oklahoma" product to class.
8. Study	____	the Information Sheet, objective 3.
Optional: Read	____	an OSU Fact Sheet.
Optional: Visit	____	a County Extension office on a field trip.
Optional: Complete	____	a FmHA loan application.
9. Study	____	the Information Sheet, objective 4.
Optional: Visit	____	a library that has copies of the U.S. Code on file.
Optional: Write	____	a report on a specific piece of legislation that affects animal production.
10. Study	____	the Information Sheet, objective 5.
Optional: Write	____	a private agency and request information about joining.
Optional: Oral Report	____	on the purpose, membership, and activities of a private agency.
11. Do	____	Assignment Sheet 1.
12. Stop	____	and have your instructor evaluate your work from the Assignment Sheet. After your work has been evaluated, follow your instructor's recommendations.
13. Study	____	the Information Sheet, objective 7.
Optional: Visit	____	a pilot project.
Optional: Talk	____	with a county extension agent.

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Optional:
Oral Report ____ on the actual and/or proposed effects of new programs.

14. Do ____ Assignment Sheet 2.

15. Stop ____ and have your instructor evaluate your work from the Assignment Sheet. After your work has been evaluated, follow your instructor's recommendations.

16. Study ____ the Information Sheet, objective 9.

Optional:
List ____ things that you think should be included in future farm bills.

Optional:
Contact ____ a member of Congress for information on the 1995 Farm Bill. Give him your ideas about what should be included.

17. Take ____ the posttest provided by your instructor. Have your instructor evaluate your completed test. After your test has been evaluated, follow your instructor's recommendations.

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WRITTEN TEST

PRIVATE AND GOVERNMENT AGENCIES, THEIR SERVICES, AND PROGRAMS A-3

Name _____ Score ____

OBJECTIVE 1

Choose the word or phrase to complete statements about the development, structure, and current status of the USDA.
Write the letter of the answer in the blank.

____ 1. The USDA is administered by the

A. United States Congress
B. Secretary of the Interior
C. Secretary of Agriculture
D. Secretary of State

____ 2. One of the USDA's areas of responsibilities is

A. enhancing and protecting the environment
B. keeping foreign food products out of the USA
C. encouraging urban development
D. aiding the computer industry

____ 3. The proposed reorganization of the USDA would

A. make it bigger
B. streamline the organization
C. place it under the Department of the Interior
D. eliminate the Secretary of Agriculture's position

____ 4. The act that created the USDA was signed into law by President

A. George Washington
B. Abraham Lincoln
C. Jimmy Carter
D. Ronald Reagon

____ 5. In 1889, the USDA was made the eighth _____ in the federal government.

A. agricultural agency
B. agency to get a budget
C. executive department
D. largest agency

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____ 6. The credit and lending services of the USDA are _____ the largest banks in the country.

A. equal to
B. less than
C. more than
D. patterned after

____ 7. The USDA has the _____ budget in U.S. government.

A. smallest
B. most balanced
C. most complicated
D. fourth-largest

____ 8. One of the USDA's initial purposes was to

A. develop the best seeds
B. protect the environment
C. lend money to farmers
D. expand the agricultural market in other countries

____ 9. One of the USDA's current areas of responsibilities includes:

A. growing larger
B. protecting the Secretary of Agriculture
C. inspecting and grading the quality of animals
D. importing fine china

____ 10. The USDA is currently organized into ___ major divisions.

A. 6
B. 3
C. 15
D. 43

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OBJECTIVE 2

Discuss services and responsibilities of the Oklahoma Department of Agriculture. Write a short answer to each question.

1. Discuss what coordinators in International Market Development help to avoid.

2. What falls under the jurisdiction of Plant Industry and Consumer Services?

3. Complete this statement: "As a regulatory agency, ODA ..."

4. List the general concerns ODA has as a service agency.

5. Name animals that can cause wildlife damage and explain how ADCS usually controls that damage

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6. What does Meat Inspection Services inspect?

_____

_____

7. Explain why the Animal Health Service inspects livestock

_____

_____

_____

8. Name the three main sections of Market Development Services.

_____

_____

_____

OBJECTIVE 3

Match specific governmental agencies with the services they provide. Write the letter of the answer in the blank.

A. Farmer's Home Administration (FmHA)

B. Food Safety and Inspection Service

C. Livestock Marketing

D. Agricultural Marketing Service

E. Veterinary Services

F. National Milk Producers Federation

G. Animal Damage Control

H. Agricultural Stabilization and Conservation Service (ASCS)

I. OSU Cooperative Extension Service

J. American Poultry Association

K. Food and Drug Administration's (FDA) Center for Veterinary Medicine

L. Environmental Protection Agency (EPA)

M. Occupational Safety and Health Administration (OSHA)

N. Soil Conservation Services (SCS)

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____ 1. Certifies the health of exported livestock and poultry

____ 2. Conducts the Dairy Refund Payment Program

____ 3. Provides and guarantees farm loans

____ 4. Controls and regulates pesticides, water quality control and air pollution control

____ 5. Oversees a nationwide soil and water conservation program

____ 6. Provides practical answers to questions Oklahoma citizens have about the environment.

____ 7. Publishes unbiased information on all aspects of farm and ranch products

____ 8. Insures meat and poultry are safe, wholesome, and accurately labeled

____ 9. Develops and administers programs concerned with the safety and effectiveness of animal drugs

____ 10. Reduces livestock problems caused by birds, rodents and predators

____ 11. Develops and oversees on-the-job safety and health standards

OBJECTIVE 4

Discuss major legislation affecting animal production. Write your answers in the blanks.

1. Indicate what the Federal Clean Air Act was created to do and how it specifically affects the animal industry.

_____

_____

_____

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2. Explain what the Federal Water Quality Control Act was created to accomplish.

_____

_____

_____

3. Name three things the Packers and Stockyards Act establishes.

_____

_____

_____

4. In addition to legislating the need to inspect meat and meat food products, what are of the things the Federal Meat Inspection Act requires?

_____

_____

_____

OBJECTIVE 5

Choose the word or phrase to complete statements about private agencies and their services. Write the letter of the correct answer in the blanks.

____ 1. The National Cattlemen's Association functions as the central agency for the beef cattle business for:

A. Marketing cattle
B. public information and legislative relations
C. buying cattle
D. registering brands

____ 2. One activity of the Beef Industry Council is

A. promoting beef as part of the nation's diet
B. helping with barn construction
C. acting as a lending institution for beef producers
D. holding rallies with PETA

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___ 3. Member organizations of the National Livestock Council

A. register pedigrees of animals
B. maintain records of ownership
C. foster breed improvement
D. do all of the above

___ 4. The Farm Credit Council

A. acts as a central bank for cooperatives
B. maintains records of agricultural research
C. develops films on the farming industry
D. enforces all laws for the protection of animals

___ 5. People for the Ethical Treatment of Animals considers the slaughter of animals

A. a sound business practice
B. a good method for
C. cruel
D. fine as long as it is for human consumption

___ 6. The Humane Farming Association has introduced legislation outlawing

A. the protection of animals
B. the veal crate
C. the breeding of livestock
D. none of the above

___ 7. The goal of the American Sheep Industry Association is to

A. join the goals of the beef industry with the sheep industry
B. advance the standards and profitability of the sheep industry
C. stop the wool industry
D. promote the use of cotton and synthetic fabrics

OBJECTIVE 6

Evaluated on Assignment Sheet 1.

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OBJECTIVE 7

Discuss new programs for research, conservation, production, and marketing. Write your answers in the blanks.

1. What does Market Development Services plan for the future?

_____

_____

_____

2. List three things Beginning Farmers Loans may be used for.

_____

_____

_____

3. How do manure storage operations help farm and ranch operations?

_____

_____

_____

4. List the four practical uses for genetic engineering in animals currently planned for the future.

_____

_____

_____

_____

OBJECTIVE 8

Evaluated on Assignment Sheet 2.

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OBJECTIVE 9

Discuss the Farm Bill. Write a short answer to each question.

1. Discuss what the farm bill is: _____

_____

_____

_____

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2. Discuss the concerns future farm bills are expected to address

_____

_____

_____

3. Discuss what made passage of the Agricultural Adjustment Act of 1933 necessary

_____

_____

_____

4. Name some of the programs that have been created by recent farm bills

_____

_____

_____

5. Discuss some of the things for which farm bills set limits or guidelines

_____

_____

_____

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LAP SHEET	SELECTING AND BREEDING LIVESTOCK	B-1

Check the blank as you complete each step.

1. Take	___ the pretest provided by your instructor. Have your instructor evaluate your completed test. After your test has been evaluated, follow your instructor's recommendations.
2. Read	___ the introduction, unit objective, and specific objectives.
3. Do	___ the focus assignments.
4. Stop	___ and have your instructor evaluate your work from the focus assignment. After your work has been evaluated, follow your instructor's recommendations.
5. Study	___ the Information Sheet, objective 1.
Optional: Ask	___ your instructor to show you videos on reproduction.
Optional: Talk	___ with a vet or a stock manager about the importance of selecting and breeding livestock.
Optional: Visit	___ a local breeding facility.
6. Study	___ the Information Sheet, objective 2.
Optional: Watch	___ a video or other media presentation on selection.
Optional: Visit	___ a meat packing plant to observe the processing of market animals.
7. Study	___ the Information Sheet, objective 3.
8. Ask	___ your instructor to show you Transparencies 1, 2, and 3.

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Optional: **Observe**	___	a cell, egg, and sperm under a microscope.
Optional: **View**	___	a cell, egg, and sperm under a microscope.
Optional: **Watch**	___	a video on genetic principles.
9. **Study**	___	the Information Sheet, objective 4.
Optional: **Look up**	___	number of chromosome pairs in rodents, insects, fish, and birds.
10. **Study**	___	the Information Sheet, objective 5.
Optional: **Research**	___	other dominant-recessive traits.
Optional: **Watch**	___	a video on genetic characteristics.
11. **Study**	___	the Information Sheet, objective 6.
12. **Ask**	___	your instructor to show you Transparencies 4, 5, and 6.
Optional: **Talk**	___	with a stock manager about how animals are bred for specific traits.
13. **Study**	___	the Information Sheet, objective 7.
14. **Ask**	___	your instructor to show you Transparency 7.
Optional: **Investigate**	___	sex-linked traits of cattle, swine, sheep, and poultry.
15. **Do**	___	Assignment Sheet 1, objective 8.
16. **Stop**	___	and have your instructor evaluate your work from the Assignment Sheet. After your work has been evaluated, follow your instructor's recommendations.
17. **Do**	___	Assignment Sheet 2, objective 9.

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18. **Stop**	___	and have your instructor evaluate your work from the Assignment Sheet. After your work has been evaluated, follow your instructor's recommendations.
19. **Do**	___	Assignment Sheet 3, objective 10.
20. **Stop**	___	and have your instructor evaluate your work from the Assignment Sheet. After your work has been evaluated, follow your instructor's recommendations.
21. **Study**	___	the Information Sheet, objective 11.
22. **Ask**	___	your instructor to show you Transparency 8.
Optional: Watch	___	a video or media presentation on cattle abnormalities.
23. **Study**	___	the Information Sheet, objective 12.
Optional: List	___	specific conditions that would create each of these causes.
24. **Study**	___	the Information Sheet, objective 13.
Optional: Ask	___	your instructor to interpret a sample EPD with you.
Optional: Talk	___	with a breed association member about EPDs and how they relate to the breed.
Optional: Write	___	to a breed association and ask for EPD information.
25. **Do**	___	Assignment Sheet 4, objective 14.
26. **Stop**	___	and have your instructor evaluate your work from the Assignment Sheet. After your work has been evaluated, follow your instructor's recommendations.
27. **Study**	___	the Information Sheet, objective 15.
Optional: Talk	___	with a stock manager about the importance of production testing.

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Optional: Visit	___	a facility that uses production testing.
28. Do	___	Assignment Sheet 5, objective 18.
29. Stop	___	and have your instructor evaluate your work from the Assignment Sheet. After your work has been evaluated, follow your instructor's recommendations.
30. Study	___	the Information Sheet, objective 17.
Optional: Substitute	___	or add another genetic engineering event.
Optional: Talk	___	with a geneticist about genetic advances.
Optional: Read	___	an article on a recent topic in genetic engineering and present a short oral report.
Optional: Watch	___	a video on genetic engineering.
31. Study	___	the Information Sheet, objective 18.
Optional: Talk	___	with stock managers who use different mating systems to compare and contrast the advantages and disadvantages of the different systems.
Optional: Ask	___	your instructor for Handout 1.
32. Do	___	Assignment Sheet 6, objective 19.
33. Stop	___	and have your instructor evaluate your work from the Assignment Sheet. After your work has been evaluated, follow your instructor's recommendations.
Optional: Ask	___	your instructor to show the collected mating method diagrams.
34. Study	___	the Information Sheet, objective 20.

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Optional: Write	___	an essay using these terms and their definitions to describe the reproductive process.
35. Study	___	the Information Sheet, objective 21.
Optional: Visit	___	a breeding facility and observe animals in heat and the use of various marking devices.
36. Study	___	the Information Sheet, objective 22.
37. Ask	___	your instructor to show you Transparencies 9, 10, and 11.
Optional: Talk	___	with a stock manager about the optimal time to breed stock.
38. Do	___	Assignment Sheet 7, objective 23.
39. Stop	___	and have your instructor evaluate your work from the Assignment Sheet. After your work has been evaluated, follow your instructor's recommendations.
40. Do	___	Assignment Sheet 8, objective 24.
41. Stop	___	and have your instructor evaluate your work from the Assignment Sheet. After your work has been evaluated, follow your instructor's recommendations.
42. Study	___	the Information Sheet, objective 25.
Optional: Visit	___	a breeding facility that practices heat synchronization.
43. Study	___	the Information Sheet, objective 26.
Optional: Use	___	flash cards to learn gestation periods for each species.
44. Study	___	the Information Sheet, objective 27.
Optional: Visit	___	a poultry production facility.
45. Take	___	the posttest provided by your instructor. Have your instructor evaluate your completed test. After your test has been evaluated, follow your instructor's recommendations.

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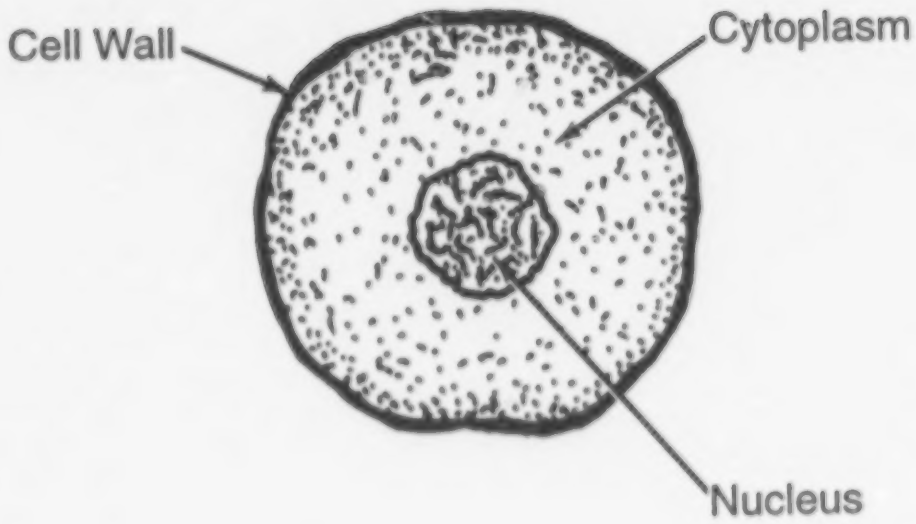
Parts of the Cell



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Cell Division - Mitosis

Resting Cell | Chromosomes Forming | Chromosomes Dividing | Chromosomes and Nucleus Separating

Cell Dividing | Two Cells Formed

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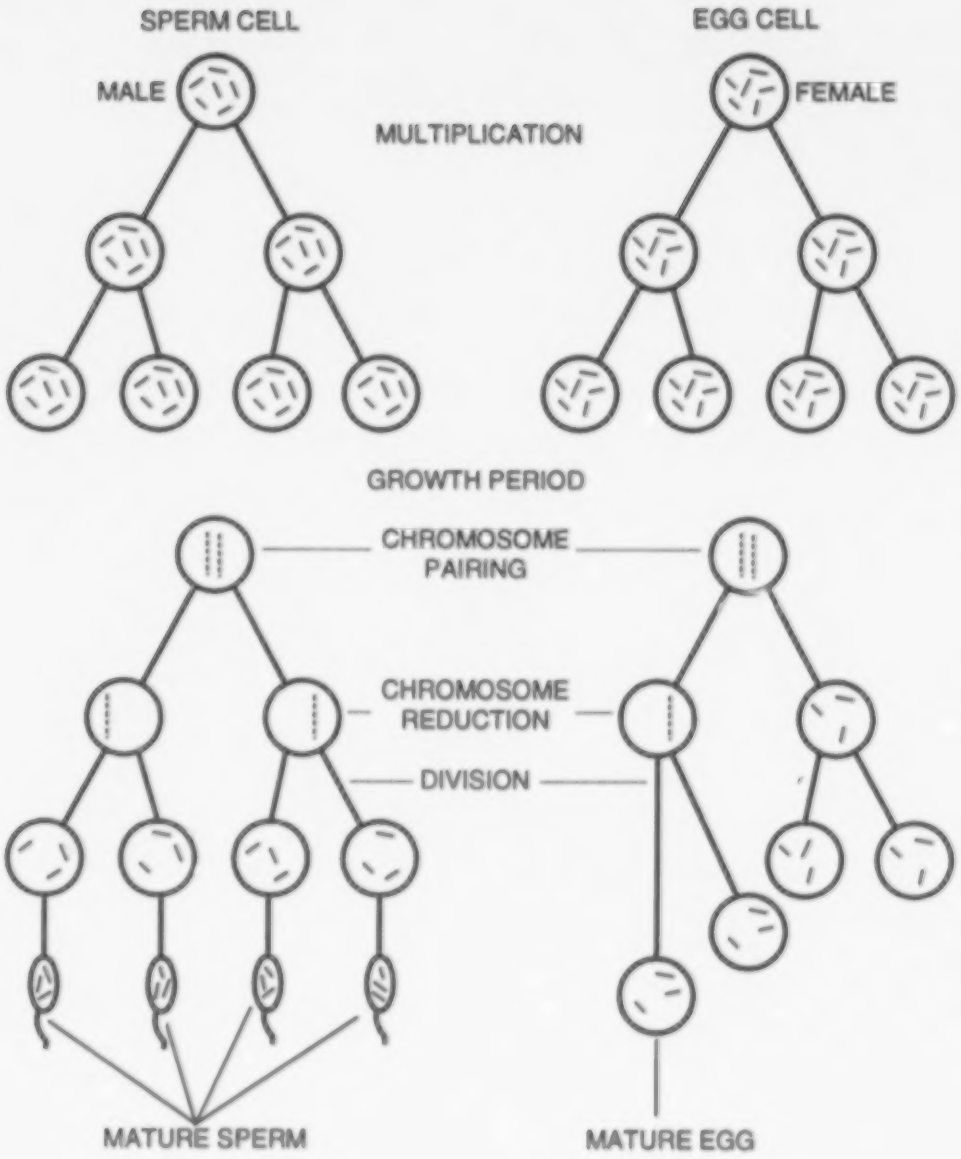
INSTRUCTOR'S RESOURCE PACKAGE - Animal Science
TRANSPARENCY MASTER 2 - CIMC - B-1 - 1

Cell Division - Meiosis



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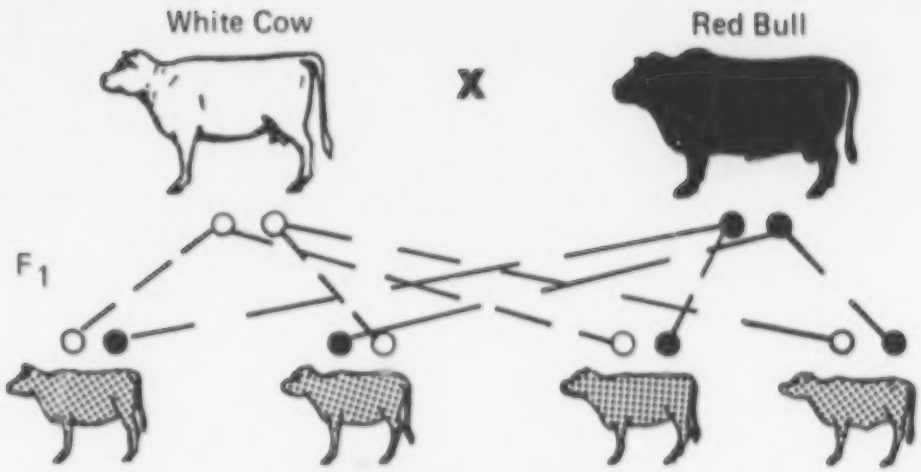
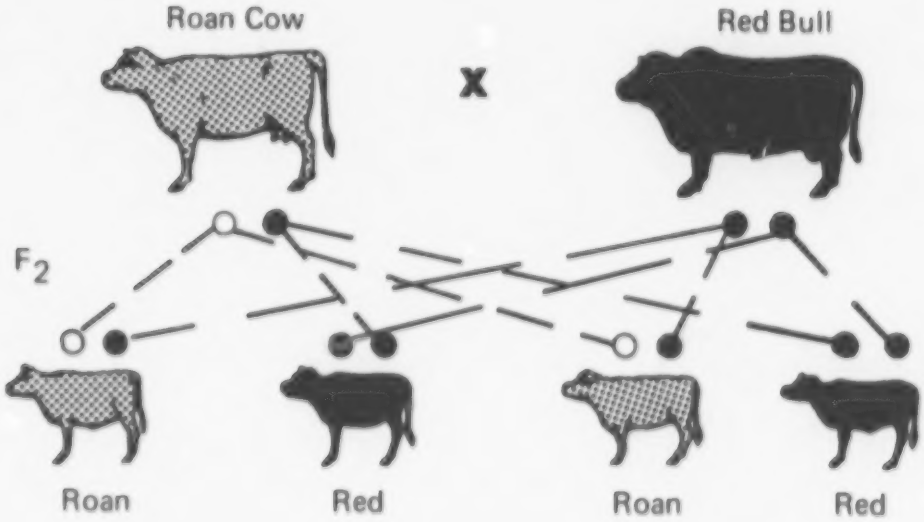
Inheritance of Color



OFFSPRINGS ALL ROAN



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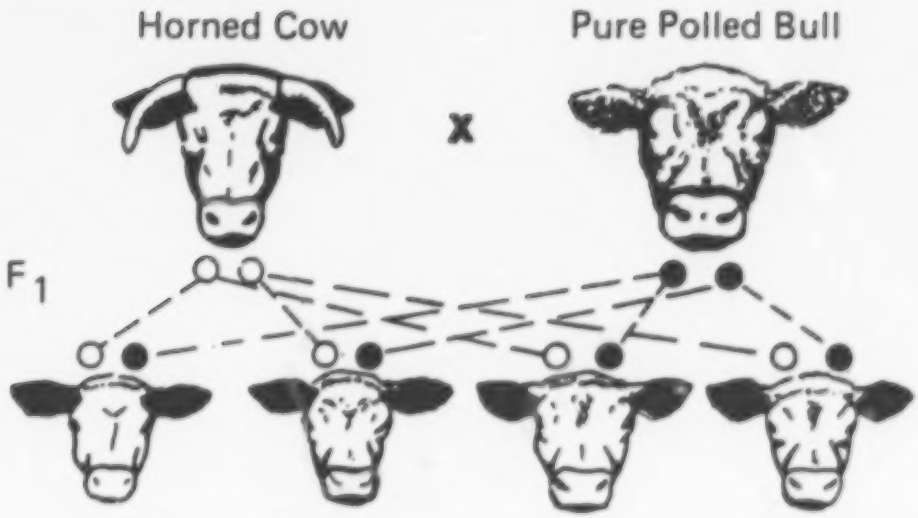
Inheritance of Horns



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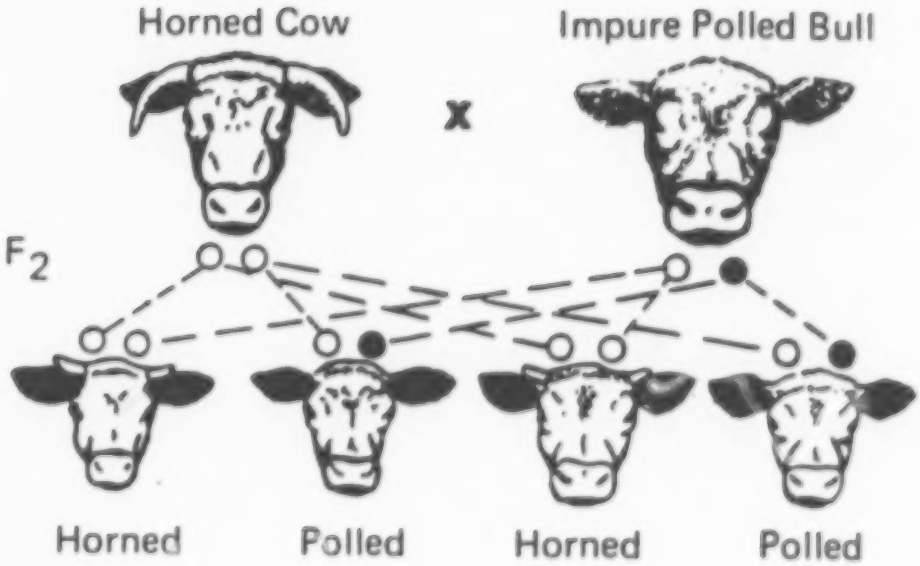

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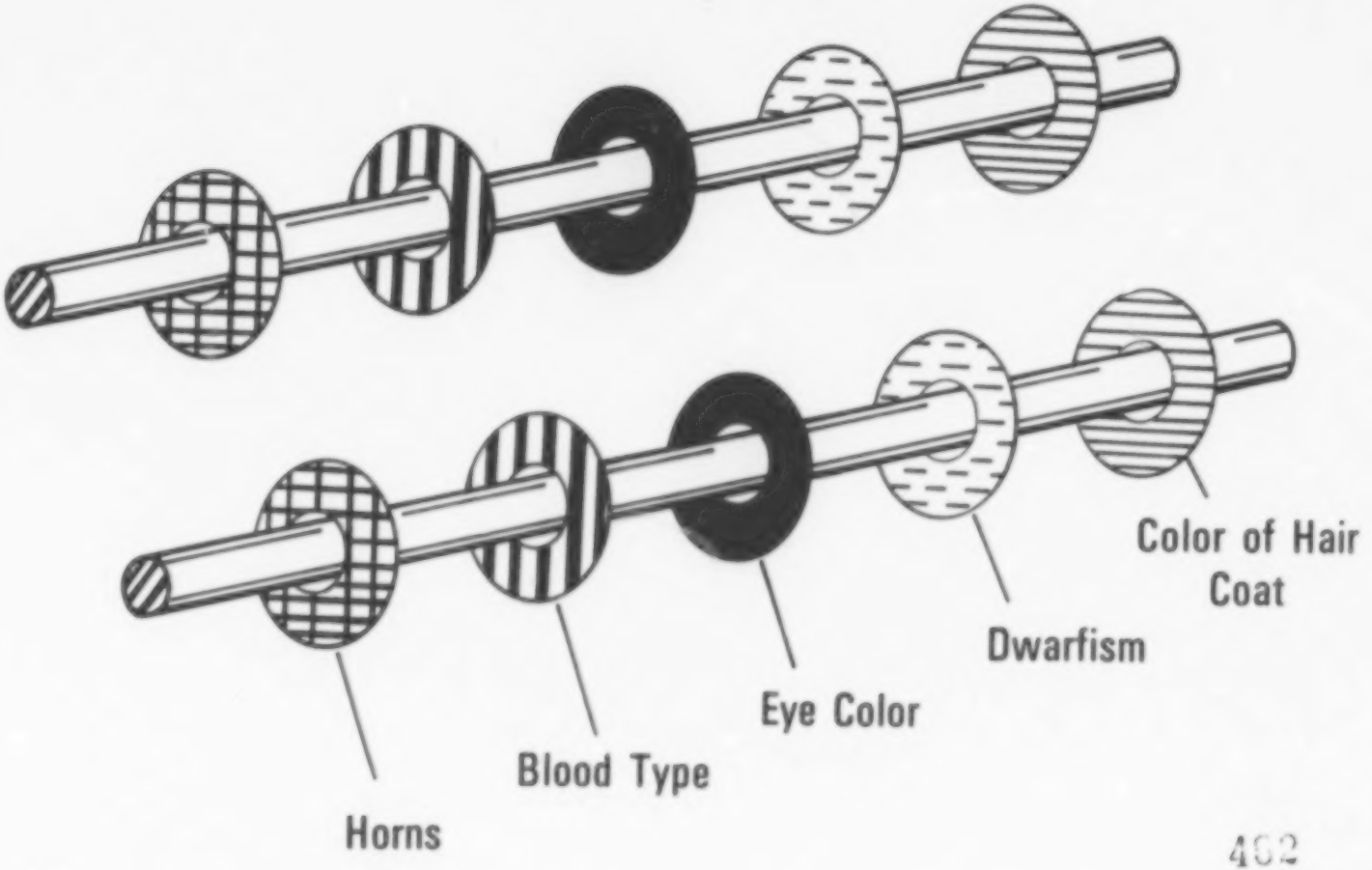
Hereditary Characteristics



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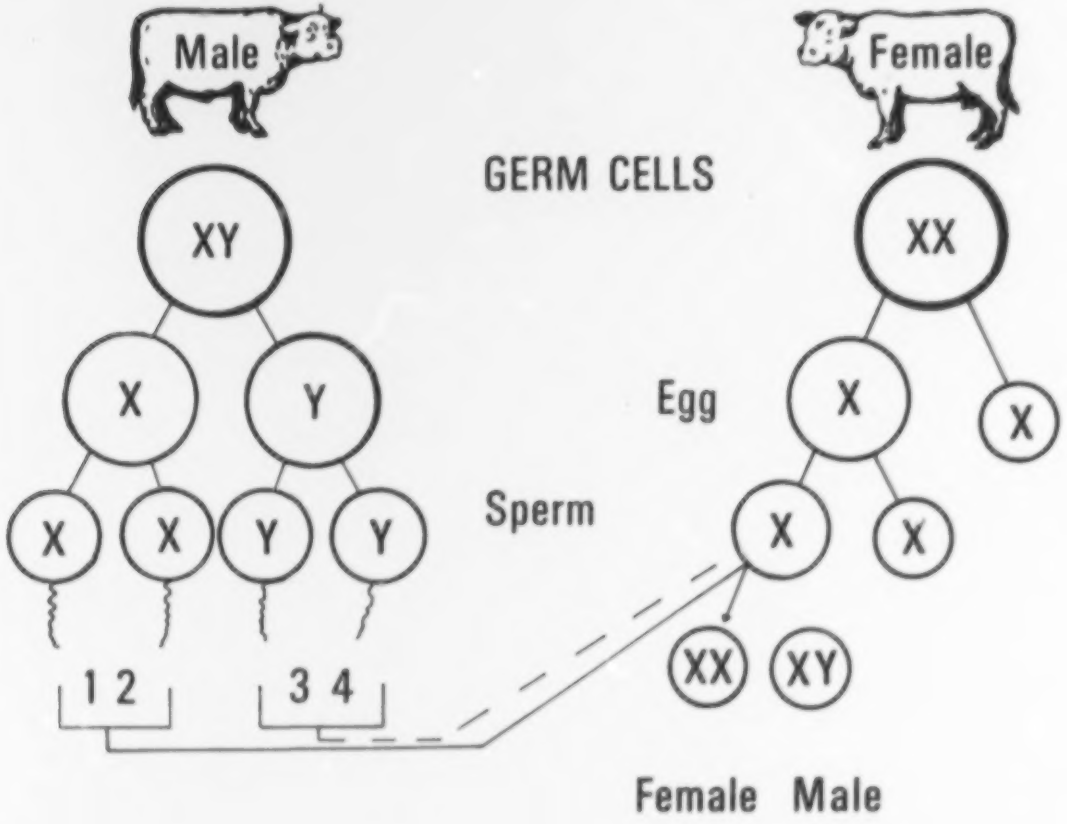
INSTRUCTOR'S RESOURCE PACKAGE - Animal Science
TRANSPARENCY MASTER 6 - CMC - B-1 - 1

Sex Determination

XY = MALE CHROMOSOME XX = FEMALE CHROMOSOME



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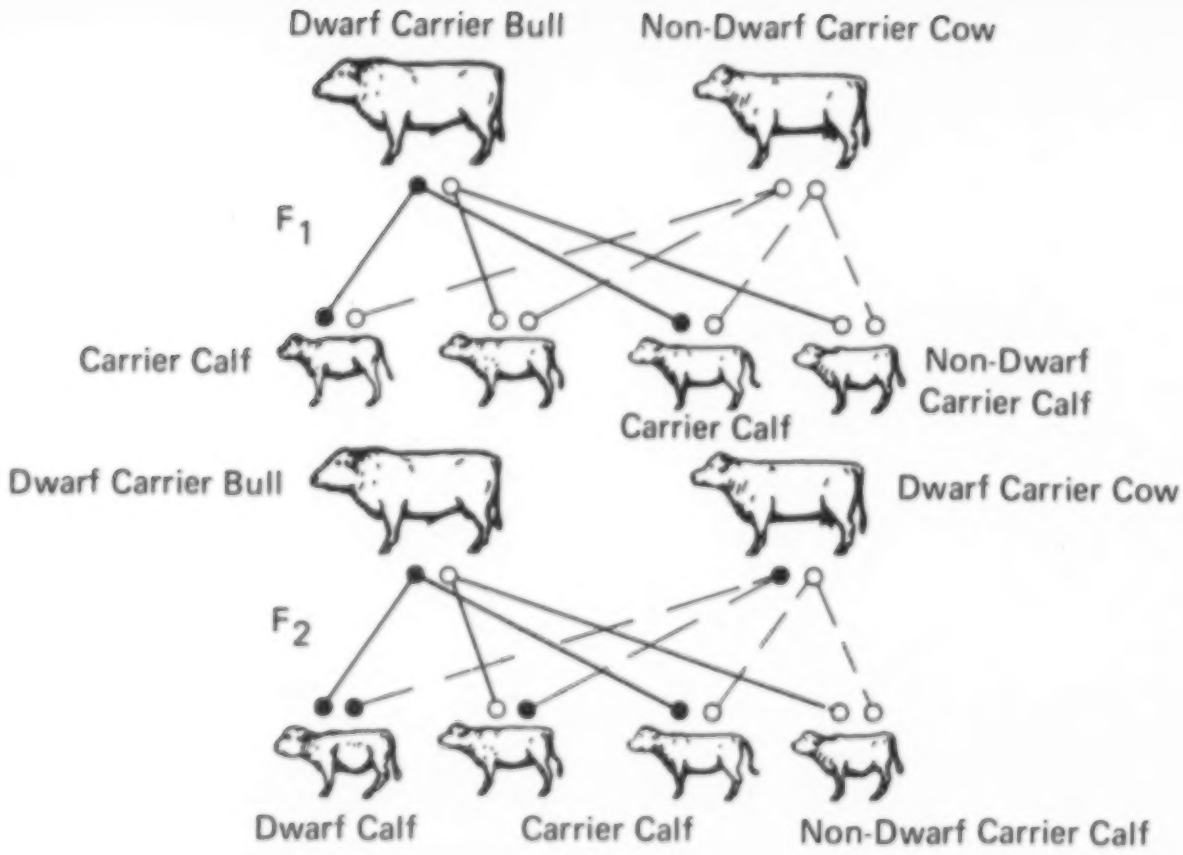
INSTRUCTOR'S RESOURCE PACKAGE - Animal Science
TRANSPARENCY MASTER 7 - CIMC - B-1 - 1

Dwarfism - Cattle



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Estrous Cycle - Cow

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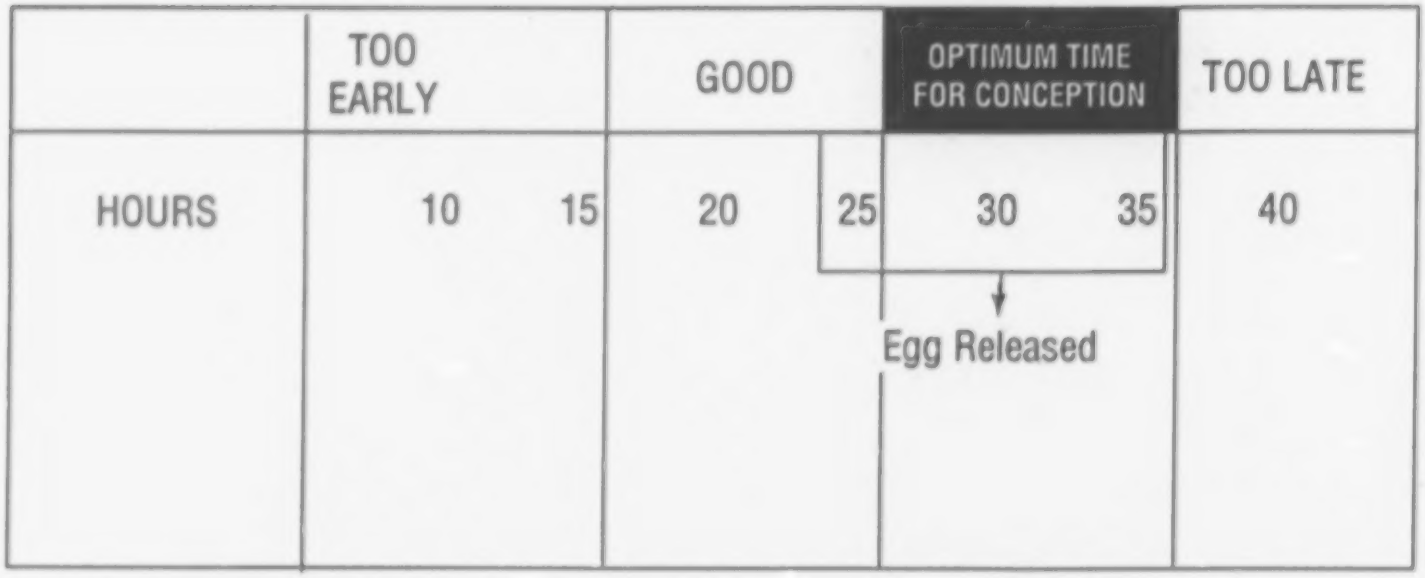
INSTRUCTOR'S RESOURCE PACKAGE - Animal Science
TRANSPARENCY MASTER 9 - CMC - 8.1 - 1

Estrous Cycle - Sow



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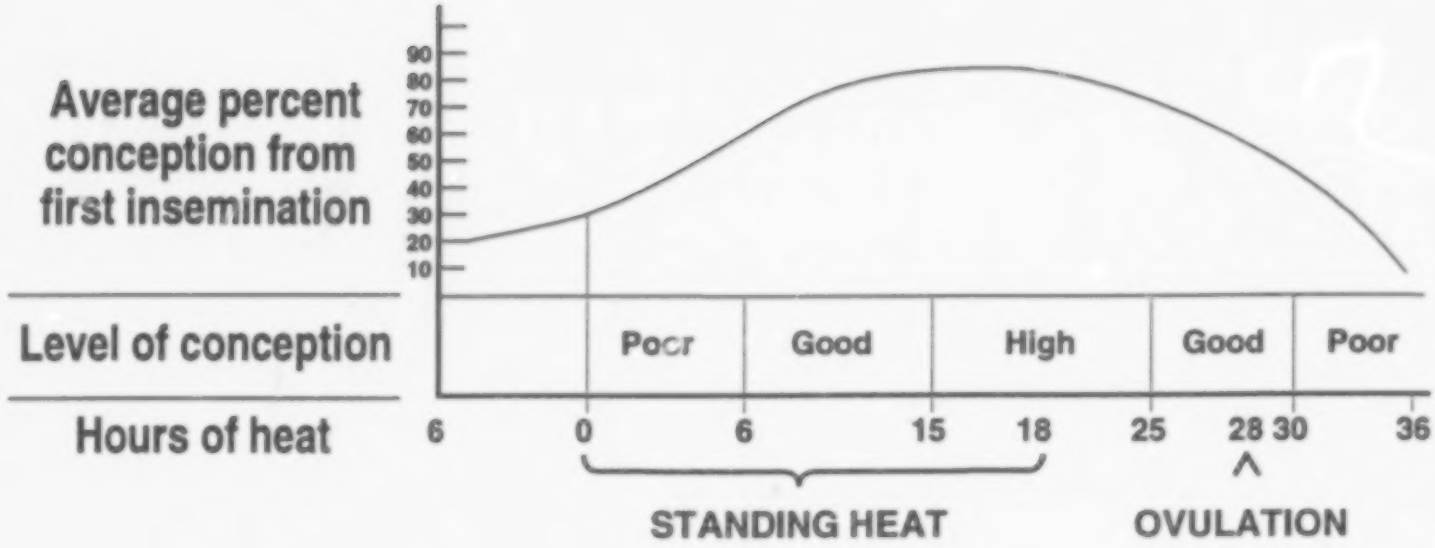
Time of Breeding and Conception Rate in Cattle



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WRITTEN TEST

SELECTING AND BREEDING LIVESTOCK

B-1

Name _____ Score _____

OBJECTIVE 1

Choose the word or phrase to complete statements about selecting and breeding livestock. Write the letter of the correct answer in the blank.

____ 1. The primary purpose of selecting and breeding is the production of high-quality, cost-effective animals that are demanded by

A. the breed association
B. the consumer
C. the local bank
D. the stockyard

____ 2. The primary EPD (Expected Progeny Difference) traits include birth weight, weaning weight, maternal influence, and

A. yearling height
B. ribeye area
C. milking ability
D. carcass weight

____ 3. Animals not meeting breeding standards should be

A. saved for future use
B. mated with a purebred
C. crossbred
D. culled

____ 4. The market demand, the type of operation, the cost and availability of good breeding stock, and regional conditions should all be considered when

A. choosing the mating method
B. determining the time of breeding
C. choosing the breeding method
D. selecting a breed

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____ 5. The mating method that involves placing one female and one male in a closely confined area is called

A. hand mating
B. pen mating
C. pasture mating
D. artificial insemination

____ 6. Females are receptive to breeding during the

A. whole estrous cycle
B. beginning of the estrous cycle
C. estrus portion of the estrous cycle
D. end of the estrous cycle

____ 7. The mating method that involves placing a male with a large number of females is called

A. hand mating
B. pen mating
C. pasture mating
D. artificial insemination

____ 8. The timing of mating is a critical factor because

A. of feed availability
B. conditions during gestation affect survivability
C. conditions during estrus affect survivability
D. of maternal milking ability

____ 9. Stock managers have two primary types of breeding: crossbreeding and

A. hand breeding
B. progeny breeding
C. pasture breeding
D. purebred breeding

____ 10. Factors you should consider when determining which animals to breed include reproductive performance of the mating males and females, the longevity of breeding capability, growth rate of progeny, and

A. carcass merit of developed progeny
B. breeding efficiency of pen mating
C. crossbreeding factors
D. conditions during gestation

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____ 11. A basic understanding of genetics enables you to

A. know the sex of an animal before it's born
B. know the birth weight of the progeny
C. estimate the characteristics of the progeny
D. estimate the carcass merit of the breeding male and female

____ 12. The mating method that involves confining a few females with one male is called

A. hand mating
B. pen mating
C. pasture mating
D. artificial insemination

OBJECTIVE 2

Choose the word or phrase to complete statements about selecting livestock for desirable characteristics. Write the letter of the correct answer in the blank.

____ 1. The genetic contribution of the male is

A. 40 percent
B. 60 percent
C. 70 percent
D. 50 percent

____ 2. Females should be selected for breeding based on health, reproductive efficiency, longevity, conformation and size, and

A. stated weaknesses
B. weaning weight
C. constitution and age
D. feed conversion

____ 3. Males should be selected for breeding based on all of the following **EXCEPT**

A. strong performance data
B. appropriate pedigree data
C. signs of infertility
D. have appropriate progeny records

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____ 4. The number of replacement females depends on the reproductive rate of the existing females, the loss of females from natural causes or from culling, and

A. the age of the existing females
B. the pedigree data of the existing females
C. the conformation of the existing females
D. the feed efficiency of the existing females

OBJECTIVE 3

Discuss basic genetic principles. Write your answers in the blanks.

1. What are the functions of the nucleus of the cell?

_____

_____

2. a. Where are genes located?

_____

b. Why are genes important?

_____

_____

3. What is the result of each cell division process?

mitosis – _____

_____

meiosis – _____

_____

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4. Describe briefly the process of meiosis.

_____

_____

_____

_____

5. When does fertilization occur?

_____

_____

6. a. Are genes the only factors that affect animal traits? _____

   b. Explain:

_____

_____

_____

7. Describe two events that can happen during meiosis that affect the genes in each gamete.

_____

_____

_____

_____

May be photocopied for student use.

OBJECTIVE 4

Match types of livestock to their numbers of chromosome pairs. Write the letter of the correct answer in the blank.

A. 34 pairs
B. 23 pairs
C. 46 pairs
D. 19 pairs
E. 6 pairs
F. 12 pairs
G. 27 pairs
H. 30 pairs

____ 1. humans

____ 2. cattle

____ 3. sheep

____ 4. swine

____ 5. chickens

OBJECTIVE 5

Choose the word or phrase to complete statements about how genetic characteristics are transmitted. Write the letter of the correct answer in the blank.

____ 1. The two types of genes are dominant genes and

A. polled genes
B. inherited genes
C. progeny genes
D. recessive genes

____ 2. Incomplete dominance occurs when

A. neither gene is totally dominant
B. both genes are dominant
C. both genes are recessive
D. the recessive gene is dominant

____ 3. The dominant gene for Hereford face color produces white coloring. The recessive gene produces black coloring. Ww would result in

A. black coloring
B. white coloring
C. mixture of black and white coloring
D. not able to determine color with information provided

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____ 4. Polled is dominant over horned. Which of the following is the proper way to abbreviate a polled cow with a recessive gene for horned?

A. PP
B. Pp
C. pp
D. not enough information

____ 5. Color is controlled by

A. one gene
B. one pair of genes
C. several genes
D. several pairs of genes

____ 6. Growth rate is controlled by

A. one gene
B. one pair of genes
C. several genes
D. several pairs of genes

OBJECTIVE 6

Discuss inherited traits and heritability. Write your answers in the blanks.

1. What is the difference between genotype and phenotype?

_____

_____

_____

_____

2. What are five heritable swine traits?

_____

_____

_____

_____

_____

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3. What are four heritable sheep traits?

_____

_____

_____

_____

4. What are five heritable beef cattle traits?

_____

_____

_____

_____

_____

5. What are five heritable dairy cattle traits?

_____

_____

_____

OBJECTIVE 7

Discuss sex determination and sex-linked traits. Write your answers in the blanks.

1. What is the chromosomal makeup of sex determination in mammals?

   female – _____

   male – _____

2. What is the chromosomal makeup of sex determination in poultry?

   female – _____

   male – _____

450

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3. What is meant by the term sex-linked traits? Give an example.

_____

_____

_____

OBJECTIVE 8 **Evaluated on Assignment Sheet 1.**

OBJECTIVE 9 **Evaluated on Assignment Sheet 2.**

OBJECTIVE 10 **Evaluated on Assignment Sheet 3.**

OBJECTIVE 11 **Match abnormal genetic conditions to their descriptions.** Write the letter of the correct answer in the blank.

A. epilepsy	I. hairlessness
B. heart failure	J. stubbiness
C. hemophilia	K. cerebral hernia
D. agnathia	L. dwarfism
E. spider syndrome	M. splay toe
F. bulldog	N. recessive genes
G. PSS	O. lethal genes
H. fertilization	P. splay foot

____ 1. Condition caused by a recessive gene that results in eye sockets that are large; nasal bones that are short and broad; and a forehead that is broader than normal.

____ 2. Condition that occurs when a recessive gene causes calves to be short-headed, short-legged, or pot-bellied.

____ 3. A sex-linked recessive gene that produces a lower jaw that is several inches shorter than the upper jaw.

____ 4. The name of any of a number of genetic factors that cause death of the young, usually during prenatal development or at birth.

____ 5. The affected animal is hairless over all or part of its body.

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6. A condition caused by a recessive gene that results in a calf having an opening in its skull allowing brain tissue to protrude.

7. A condition in which a male sex-linked recessive gene affects the coagulating ability of the affected animal's blood.

8. A dominant gene causes an animal to lower its head, chew its tongue, foam at the mouth, and finally collapse into a coma.

9. A condition that results in bent forelimbs, "twisted" spine, and angled rump in black-faced sheep.

10. A recessive gene causes a ligament in the foot to deteriorate, making the toes spread outward.

11. A condition caused by a recessive gene and triggered by stress in swine; causes a failure of the blood circulation system.

OBJECTIVE 12

List factors affecting fertility. List factors affecting fertility.

1. List nine factors affecting fertility.

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OBJECTIVE 13

Choose the word or phrase to complete statements about Expected Progeny Difference records (EPDs). Write the letter of the correct answer in the blank.

____ 1. The primary EPD traits include birth weight, weaning weight, milking ability, maternal influence, and

A. carcass weight
B. yearling height
C. yearling weight
D. fat thickness

____ 2. Assume that one bull has an EPD for birth weight of +5 and another bull has an EPD for birth weight of -3. The estimated difference in birth weight would be

A. 2 pounds
B. 15 pounds
C. -2 pounds
D. 8 pounds

____ 3. EPDs can be calculated for

A. cows
B. progeny
C. bulls
D. all animals within a breed

____ 4. All of the following are EPD traits **EXCEPT**

A. ribeye area
B. fat thickness
C. gestation length
D. carcass height

____ 5. You can use EPDs to

A. make educated breeding and selecting decisions
B. determine the exact chromosome makeup of offspring
C. determine the exact size of yearling animals
D. gain information about your competitors

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____ 6. Care should be used when using EPDs because EPD comparisons cannot be made across breeds, EPDs cannot be used to predict absolute performance, and

A. comparisons cannot be made across families within breeds
B. an EPD represents the average expected progeny
C. comparisons cannot be made between male and female
D. an EPD addresses only primary traits

OBJECTIVE 14 **Evaluated on Assignment Sheet 4.**

OBJECTIVE 15 **Select from a list true statements about production testing.** Write an "X" in the blank before each correct answer.

____ 1. Production testing is the practice of evaluating and selecting animals on the basis of progeny and performance testing.

____ 2. Performance test records are used to evaluate progeny.

____ 3. Temperament is an important beef cattle trait.

____ 4. Performance test records are used to improve the grade of offspring produced.

____ 5. Litter size is an important swine trait.

____ 6. Performance testing evaluates animals on their individual merit or performance.

____ 7. Progeny testing evaluates animals on the merit of their parents.

____ 8. Progeny testing is used to improve the grade of offspring produced..

____ 9. Carcass characteristics a e important beef cattle traits.

____ 10. Feedlot gain is an important dairy cattle trait.

____ 11. Performance test records are used to reduce the number of animals that have to be culled.

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____ 12. Fleece weight is an important sheep trait.

____ 13. Daily rate of gain is an important beef cattle trait.

____ 14. Performance test records are used to select replacement males and females.

____ 15. Carcass characteristics are an important trait for beef cattle, dairy cattle, sheep, and swine.

____ 16. Stock managers use production testing to focus on traits that provide economic benefit for the stock.

OBJECTIVE 16

Evaluated on Assignment Sheet 5.

OBJECTIVE 17

Discuss a specific advance in genetic engineering. Write your answers in the blanks.

1. Where is bovine somatotropin (BST) produced naturally?

_____

_____

2. What effect does BST have on cows?

_____

_____

3. Describe how genetic engineering has made it possible for bacteria to produce BST.

_____

_____

_____

4. What is the difference between genetically engineered BST and naturally produced BST?

_____

_____

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5. What effect has been seen in cows injected with BST bacteria?

_____

_____

OBJECTIVE 18

Match mating systems to their descriptions, advantages, and disadvantages. Write the letter of the correct answer in the blank.

Part 1:

A. crisscrossing
B. four-way crosses
C. inbreeding
D. two-way crosses
E. purebred breeding
F. outbreeding
G. three-way crosses
H. backcrossing
I. commercial improvement
J. grade crossing
K. linebreeding
L. outcrossing

____ 1. involves mating animals which can be traced back to one common ancestor

____ 2. involves mating crossbred females with a sire of a third breed

____ 3. involves the mating of purebred animals of the same breed

____ 4. involves mating crossbred females to a sire belonging to one of the parent breeds of the female

____ 5. involves the mating of closely related animals, increasing the genetic purity of the stock produced

____ 6. involves mating a sire from one breed to a female from another breed

____ 7. involves the mating of purebred sires to grade females

____ 8. involves the mating of animals of different families within the same breed

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Part 2:

A. straight breeding B. cross breeding

Advantages:

____ 1. higher fertility

____ 2. increased disease resistance

____ 3. concentrates selected traits

____ 4. increased hybrid vigor

____ 5. develops uniformity

____ 6. increased growth

Disadvantages:

____ 1. loss of hybrid vigor

____ 2. not eligible for registry

____ 3. reduced uniformity of offspring

____ 4. may result in less desirable traits

OBJECTIVE 19 **Evaluated on Assignment Sheet 6.**

OBJECTIVE 20 **Define breeding periods.** Define the following terms.

1. puberty

_____

_____

2. estrous cycle

_____

_____

May be photocopied for student use.

3. ovulation

_____

_____

4. fertilization

_____

_____

5. gestation

_____

_____

6. parturition

_____

_____

OBJECTIVE 21

Choose the word or phrase to complete statements about estrus. Write the letter of the correct answer in the blank.

____ 1. All of the following are estrus detection methods **EXCEPT**

A. observation
B. use of sterile female
C. use of teaser
D. use of marking devices

____ 2. Signs of estrus in cattle and swine include standing to be ridden, riding others, swelling of the vulva, and

A. frequent urination
B. calmness
C. cloudy mucus flowing from the vulva
D. grunting

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____ 3. Ewes in estrus

A. have cloudy mucus at the vulva
B. show no visible signs
C. stand to be ridden
D. become agitated and restless

____ 4. Most ewes come into heat in the

A. summer
B. fall
C. spring
D. spring and fall

____ 5. A teaser is

A. a female not in heat placed among a group of females in heat
B. a false estrus
C. an animal that will respond to a female in heat
D. a sow that grunts as if in estrus to attract a boar

OBJECTIVE 22

Match farm animals to their normal estrous cycles. Write the letter of the correct answer in the blank.

A. cattle
B. swine
C. poultry
D. sheep

____ 1. The average length of estrus is 3 days. Ovulation occurs during mid-estrus.

____ 2. The average length of estrus is 16-18 hours. Ovulation occurs 10-14 hours after the start of estrus.

____ 3. The average length of estrus is 30 hours. Ovulation occurs late in estrus.

OBJECTIVE 23

Evaluated on Assignment Sheet 7.

OBJECTIVE 24

Evaluated on Assignment Sheet 8.

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OBJECTIVE 25

Choose the word or phrase to complete statements about heat synchronization. Write the letter of the correct answer in the blank.

____ 1. Synchronization of estrus involves using hormones to cause all the females to come into heat

A. during the spring
B. within a short period of time
C. at the beginning of each month
D. during the fall

____ 2. The advantages of heat synchronization include reducing the labor needed to detect estrus, easier scheduling of artificial insemination, shorter breeding and calving seasons, and

A. reducing conception rate
B. the production of a more uniform calf crop
C. greater EPD accuracy
D. low cost of the hormone treatment

____ 3. The disadvantages of heat synchronization include all of the following **EXCEPT**

A. lower conception rate
B. intensified calving period
C. higher disease rate
D. the cost of the hormone treatment

OBJECTIVE 26

Match livestock to their gestation periods. Write the letter of the correct answer in the blank.

A. 24 days	D. 148 days
B. 114 days	E. 283 days
C. 365 days	F. 214 days

____ 1. cattle

____ 2. sheep

____ 3. swine

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OBJECTIVE 27

Discuss methods of selecting poultry. Write your answers in the blanks.

1. What are the three primary methods of selecting poultry?

_____

_____

_____

2. What are four characteristics that lead to high egg production?

_____

_____

_____

_____

3. What should you do with poultry that does not meet layer or broiler standards?

_____

_____

4. What are four characteristics that lead to high broiler market value?

_____

_____

_____

_____

_____

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GUIDE FOR MATING METHODS

AGE OF THE SIRE*	NUMBER OF FEMALES FOR HAND MATING	NUMBER OF FEMALES FOR PASTURE MATING
BULL	One bull for 25 cows under range conditions	
1-2 years	10-12	8-10
2-3 years	25-30	20-25
over 3 years	40-50	25-40
BOAR		
8-12 months	24	12
over 1 year	50	35-40
RAM		
lamb	20-25	not recommended
over 1 year	50-75	35-60
POULTRY	Males over 3 years are not good breeders	
FLOCK MATING		
light breeds – leghorns, etc.		15-20
general purpose – wyandotte, etc.		10-15
heavy breeds – dark Cornish, etc.		8-12

* Scrotal circumference and semen quality also affect the number of females a male can service.

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EXPLANATION OF LISTINGS

1.	2.		3.		4.		5.	6.	
ASA MR PERFORMER 101 911199 2/10/88 FULLBLOOD RED HORNED S: SUPER GAINER D: CHANTILLY LACE 0947 B: JOHN DOE SALERS, ELIZABETH, CO O: PERFORMER SYNDICATE, ELIZABETH, CO	Birth Weight	ACC	Weaning Weight	ACC	Yearling Weight	ACC	Maternal Wean. Wt.	Maternal Milk	ACC
	-0.2	.85	+ 12.8	.80	+ 18.2	.59	+ 18.8	+ 12.4	.52

1. **SIRE INFORMATION** — *Sires are listed in alphabetical order according to their registered name followed by registration number. Also included are the bull's birthdate, percentage Salers (fullblood or purebred); recorded color; recorded horned-polled-scurred condition; sire (S), dam (D), breeder (B), and current owner(s), (O). An alphabetical index of sires by common names is included in the back of the summary as an additional reference in locating sires.*

2. **BIRTH WEIGHT** — *Birth weight EPD provides a prediction of differences between sires for progeny birth weights. It is useful as an indicator of calving ease as larger calves at birth tend to result in more difficult births. Positive values indicate heavier birth weights.*

3. **WEANING WEIGHT** — *Weaning weight EPD provides a comparative assessment of a sire's progeny weights at 205 days of age. It indicates growth from birth to weaning.*

4. **YEARLING WEIGHT** — *Yearling weight EPD predicts progeny differences for 365 day weight reflecting a sire's genetic influence on both pre-weaning and post weaning growth rates.*

5. **MATERNAL WEANING WEIGHT** — *Maternal weaning weight EPD provides an estimate of the weaning weight of daughters' calves. The EPD values predict the difference in average 205-day weight of a bull's daughters' calves compared to calves from daughters of other bulls evaluated. It reflects a combination of the milking ability of a bull's daughters and the growth potential of their calves. Maternal weaning weight, sometimes referred to as total maternal or growth plus milk, is calculated by adding one-half the sire's EPD for weaning weight to the sire's EPD for milk.*

6. **MATERNAL MILK** — *Maternal milk EPD evaluates the milking ability of a bull's daughters. It is expressed in pounds of calf weaning weight and predicts the differences in average 205-day weight of a sire's daughters' calves due to milk production. It estimates a sire's contribution to the growth of daughters' calves solely through his transmission of genes for milk production to daughters. Positive values indicate above average milking ability of daughters.*

ASA MR PERFORMER ranks in the following percentiles for the respective EPD traits as taken from the percentile chart on page V:

EPD TRAITS AND RANGES — NON PARENTS

TRAIT	EPD	PERCENTILE
Birth Weight	-0.2	upper 25%
Weaning Weight	+12.8	upper 10%
Yearling Weight	+18.2	upper 15%
Maternal Weaning Weight	+18.8	upper 5%
Maternal Milk	+12.4	upper 5%

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PERCENTILE CHARTS

ALL SIRES (7,131)

The trait averages, ranges and percentiles are given on all sires to allow comparative evaluation on a bull of particular interest in relation to where the bull ranks in the population of Salers bulls.

EPD MEANS AND RANGES — ALL SIRES			
TRAIT	**AVG**	**LOW**	**HIGH**
Birth Wt	0.6	-6.7	7.9
Weaning Wt	5.8	-24.6	42.9
Yearling Wt	9.5	-28.2	59.2
Mat Weaning Wt	6.2	-24.0	29.5
Maternal Milk	3.3	-17.6	19.7

PERCENTILE BREAKDOWN — ALL SIRES					
%	Birth Weight	Weaning Weight	Yearling Weight	Maternal Weaning Wt.	Maternal Milk
5	-1.5	15.8	22.9	15.0	10.6
10	-1.0	12.7	19.6	12.9	9.0
15	-0.6	11.1	17.4	11.6	7.8
20	-0.4	9.9	15.5	10.5	6.8
25	-0.2	8.9	14.1	9.6	6.0
30	0.0	8.0	12.7	8.8	5.4
35	0.2	7.3	11.5	8.0	4.7
40	0.3	6.6	10.6	7.3	4.2
45	0.4	5.9	9.6	6.6	3.6
50	0.5	5.3	8.8	5.9	3.1
55	0.6	4.9	8.2	5.3	2.6
60	0.8	4.6	7.7	4.7	2.1
65	1.0	4.0	6.9	4.3	1.9
70	1.2	3.3	6.0	3.8	1.4
75	1.4	2.5	5.0	3.1	0.8
80	1.7	1.6	3.7	2.3	0.2
85	2.0	0.6	2.1	1.4	-0.7
90	2.4	-0.9	-0.1	0.0	-1.9
95	3.0	-3.7	-3.1	-2.3	-3.9

DAMS (93,831)

EPDs of dams are generally based on fewer progeny records than sires and are associated with lower accuracy values. As prediction of genetic merit, they are useful for planning matings and evaluating the cowherd.

EPD MEANS AND RANGES — ALL DAMS			
TRAIT	**AVG**	**LOW**	**HIGH**
Birth Wt	0.4	-5.8	7.8
Weaning Wt	5.2	-21.8	32.8
Yearling Wt	8.5	-26.5	45.4
Mat Weaning Wt	5.6	-30.3	44.3
Maternal Milk	3.0	-26.7	30.6

PERCENTILE BREAKDOWN — ALL DAMS					
%	Birth Weight	Weaning Weight	Yearling Weight	Maternal Weaning Wt.	Maternal Milk
5	-1.3	12.3	18.4	14.1	9.8
10	-0.8	10.2	15.5	11.8	8.0
15	-0.5	8.9	13.5	10.3	6.8
20	-0.3	7.9	12.1	9.2	5.9
25	-0.2	7.1	11.0	8.3	5.2
30	0.0	6.4	10.1	7.5	4.5
35	0.1	5.9	9.4	6.8	4.0
40	0.2	5.5	8.8	6.1	3.4
45	0.3	5.1	8.4	5.5	2.9
50	0.4	4.9	8.1	4.9	2.5
55	0.4	4.8	8.0	4.5	2.0
60	0.5	4.5	7.7	4.4	2.0
65	0.6	4.2	7.2	4.2	1.9
70	0.7	3.7	6.6	3.6	1.5
75	0.8	3.2	5.9	3.0	0.9
80	1.0	2.5	5.0	2.2	0.3
85	1.2	1.7	3.8	1.3	-0.4
90	1.5	0.5	2.1	0.0	-1.5
95	2.0	-1.5	-0.6	-2.2	-3.2

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MAIN LISTING

	Birth Weight EPD	Birth Weight ACC	Weaning Weight EPD	Weaning Weight ACC	Yearling Weight EPD	Yearling Weight ACC	Maternal Wean. Wt. EPD	Maternal Milk EPD	Maternal Milk ACC
6M AS KEY T145324 06/20/85 FULLBLOOD HORNED S: EPR AMERICAN EXPRESS 31P D: MISS KEY SERENA 3117R B: KENNETH A. OR BECKY SUTTON, SPEARFISH, SD O: MIDDLESWARTH RANCH, HENRY, NE	+ 2.7	.73	+ 16.5	.67	+ 23.4	.52	+ 2.8	- 5.7	.59
7 HALF DIAMOND JET JR66J T108974 09/27/77 FULLBLOOD HORNED S: JET D: LISON B: 7 HALF DIAMOND SALERS, TURNER VALLEY AB CANADA O: KEN MCLEOD, RED DEER AB CANADA	- 1.2	.55	+ 1.0	.46	+ 12.5	.38	+ 0.8	- 0.0	.49
6M GOOD FORTUNE 177X TP227044 10/24/88 PUREBRED RED POLLED S: KEYS FORTUNE 412S D: LCS CLAY HILLS LADY T1W B: MIDDLESWARTH RANCH, HENRY, NE O: Sold for Feeding	+ 1.2	.58	- 0.2	.54	+ 1.9	.44	- 4.7	- 4.5	.25
6M MOM SLAMMER 137Z 269167 02/26/90 FULLBLOOD RED HORNED S: MONTANA SLAMMER 831U D: 6M MISS JULIE 52T B: MIDDLESWARTH RANCH, HENRY, NE O: MIDDLESWARTH RANCH, HENRY, NE JARVIS & NANCY BRINK, LE ROY, KS	+ 3.3	.45	+ 2.2	.43	+ 11.6	.35	+ 5.3	+ 4.2	.17
7 HALF DIAMOND 89X 226840 03/18/88 FULLBLOOD HORNED S: JFW VICE REGENT 18U D: MISS 7 HALF DIAMOND 215R B: 7 HALF DIAMOND SALERS, TURNER VALLEY AB CANADA O: FIGURE 4 SALERS, SOMERSET, CO	+ 1.8	.68	+ 16.0	.58	+ 21.7	.43	+ 10.0	+ 2.0	.21
ABSOLUTE 165086 02/14/85 FULLBLOOD HORNED S: TERRIBLE D: PLOMBADE B: ALAIN DAYRAL, CHAUSSENAC FRANCE O: AC RANCHES, TEES, ALBERTA, CANADA	+ 1.6	.73	+ 2.8	.59	+ 5.0	.45	+ 2.0	+ 0.7	.42
ABSOLUTE TOO T229561 04/29/89 FULLBLOOD RED HORNED S: ABSOLUTE D: SOR PASCALE 93W B: DIEHL RANCHES, CARR, CO O: DIEHL RANCHES, CARR, CO	+ 0.2	.58	+ 7.0	.49	+ 9.4	.38	+ 6.9	+ 3.4	.15
AC ALBERT 934Y 257918 02/12/89 FULLBLOOD HORNED S: ABSOLUTE D: AC RAVISHING 05R B: AC RANCHES, TEES, ALBERTA, CANADA O: BOKE RANCH, SPEARFISH, SD	+ 0.4	.63	+ 12.3	.53	+ 15.8	.36	+ 11.3	+ 5.2	.16
AC URBAIN 736W 217806 02/20/87 FULLBLOOD HORNED S: URBAIN D: EPR NEVA 14N B: AC RANCHES, TEES, ALBERTA, CANADA O: ARLO OR RONALD HANSEL, MILES CITY, MT	- 1.1	.57	+ 10.8	.48	+ 13.6	.33	+ 9.8	+ 4.4	.44
ACTIVATOR 163680 FULLBLOOD HORNED S: ROLLAND D: ORLANGE B: MATIERE, LE CROIZET FRANCE O: COMO RANCHES, WEISER, ID JETT RANCH, GAGE, OK D. GRANT FARMS LTD., BOWDEN, ALBERTA, CANADA	+ 1.9	.63	+ 11.5	.50	+ 9.6	.39	+ 6.2	+ 0.4	.43
ALL ROYALTY 10R 125313 04/10/83 FULLBLOOD RED HORNED S: PIERRE D: ROYAL LADY 11L B: ROYAL SALERS, PAWHUSKA, OK O: T-CROSS RANCHES, COLORADO SPRINGS, CO	+ 1.4	.77	+ 10.2	.71	+ 2.9	.64	+ 2.1	- 3.0	.66
AMBASSADOR ALIAS ALBERT 171855 02/03/85 FULLBLOOD HORNED S: SERIN D: CHAMPAGNE B: ALBERT GARCELON, XAINTRIE FRANCE O: E & P RANCH, CALGARY ALB CANADA FIGURE 4 SALERS, SOMERSET, CO	- 1.6	.67	+ 0.5	.58	+ 0.0	.42	- 9.0	- 9.2	.34
AP BIG TRADE 390W 194734 03/20/87 FULLBLOOD RED HORNED S: EPR WALL STREET 67S D: ERC MISS 2905 B: AGRI PLAINS CATTLE CO, DANNEBROG, NE O: DIKOFF SALERS RANCH, ONAKA, SD	+ 1.7	.49	+ 2.4	.40	+ 7.3	.29	+ 4.7	+ 3.5	.29
AP DIPLOMAT 378U T168187 01/05/86 FULLBLOOD RED HORNED S: SLAMMER D: SMS MS MOUNTAIN RUBY 16R B: POWER MANUFACTURING LTD, SALT LAKE CITY, UT O: JACOBSEN SALERS RANCH, SUN RIVER, MT	+ 2.2	.72	- 0.9	.64	+ 9.3	.50	- 6.3	- 5.9	.43
AP FREE SPIRIT 376ST T168186 12/22/85 FULLBLOOD RED HORNED S: SLAMMER D: SMS MS MOUNTAIN RUBY 16R B: POWER MANUFACTURING LTD, SALT LAKE CITY, UT O: VEL-LEO SALERS, DEWITT, NE AGRI PLAINS CATTLE CO, DANNEBROG, NE JERRY ROLAND WEIBEL, BIGGSVILLE, IL	+ 3.2	.61	+ 8.4	.40	+ 18.1	.32	+ 1.9	- 2.3	.33

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LAP SHEET

REPRODUCTIVE ORGANS B-2

Check the blank as you complete each step.

1. Take	___ the pretest provided by your instructor. Have your instructor evaluate your completed test. After your test has been evaluated, follow your instructor's recommendations.
2. Read	___ the introduction, unit objective, and specific objectives.
3. Do	___ the focus assignments.
4. Stop	___ and have your instructor evaluate your work from the focus assignment. After your work has been evaluated, follow your instructor's recommendations.
5. Study	___ the Information Sheet, objective 1.
Optional: Review	___ what you already know about reproductive organs and their functions. Refer to Unit B-1 for information on the estrous cycle.
Optional: Watch	___ a video on reproductive organs and processes.
6. Study	___ the Information Sheet, objectives 2 and 3.
7. Ask	___ your instructor to show you Transparency 1.
8. Study	___ the Information Sheet, objectives 4 and 5.
9. Ask	___ your instructor to show you Transparencies 2 and 3.
10. Study	___ the Information Sheet, objective 6.
11. Ask	___ your instructor to show you Transparencies 4 and 5.
12. Do	___ the Assignment Sheet.

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13. Stop	___	and have your instructor evaluate your work from the Assignment Sheet. After your work has been evaluated, follow your instructor's recommendations.
14. Study	___	the Information Sheet, objective 8.
Optional: Research	___	hormones used in livestock production, such as BGH.
15. Take	___	the posttest provided by your instructor. Have your instructor evaluate your completed test. After your test has been evaluated, follow your instructor's recommendations.

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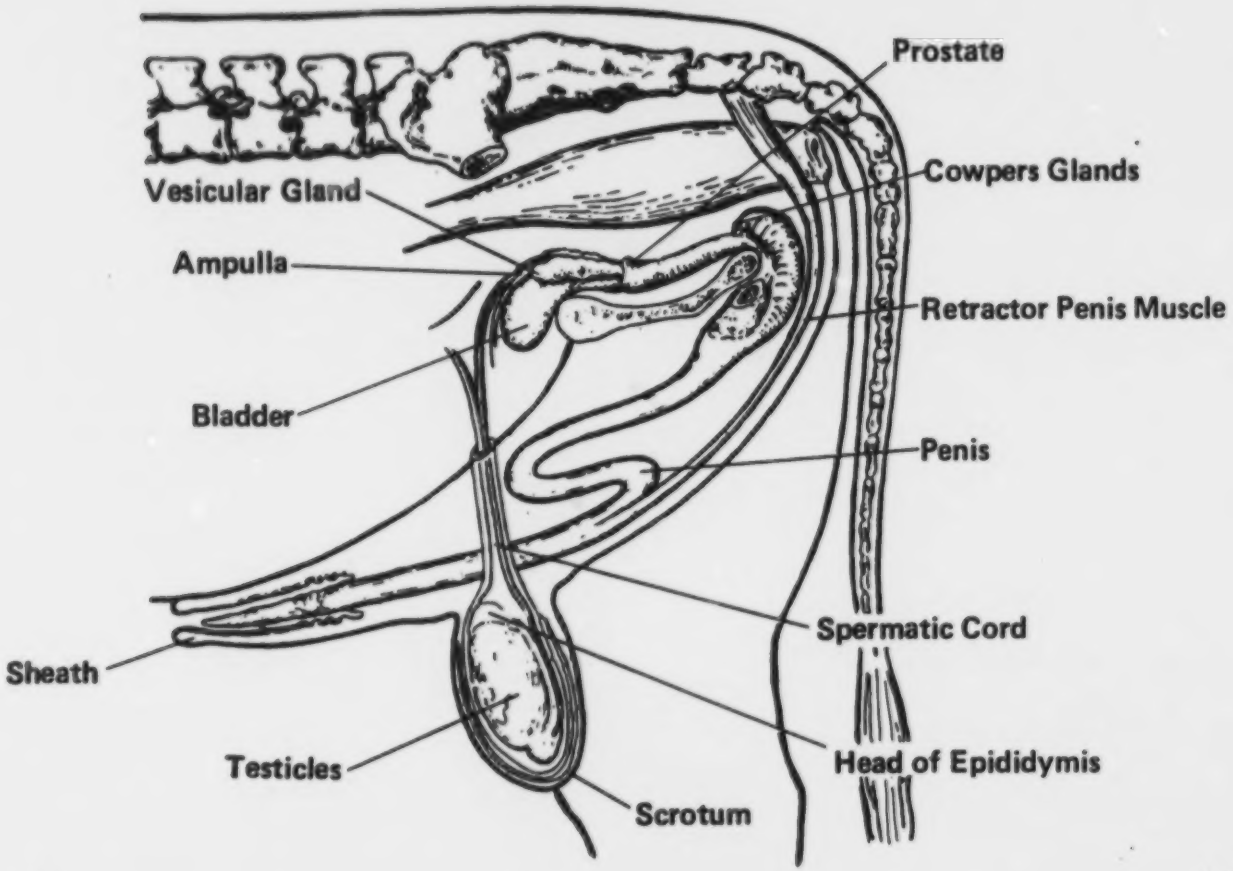
Components of the Reproductive Tract of a Bull



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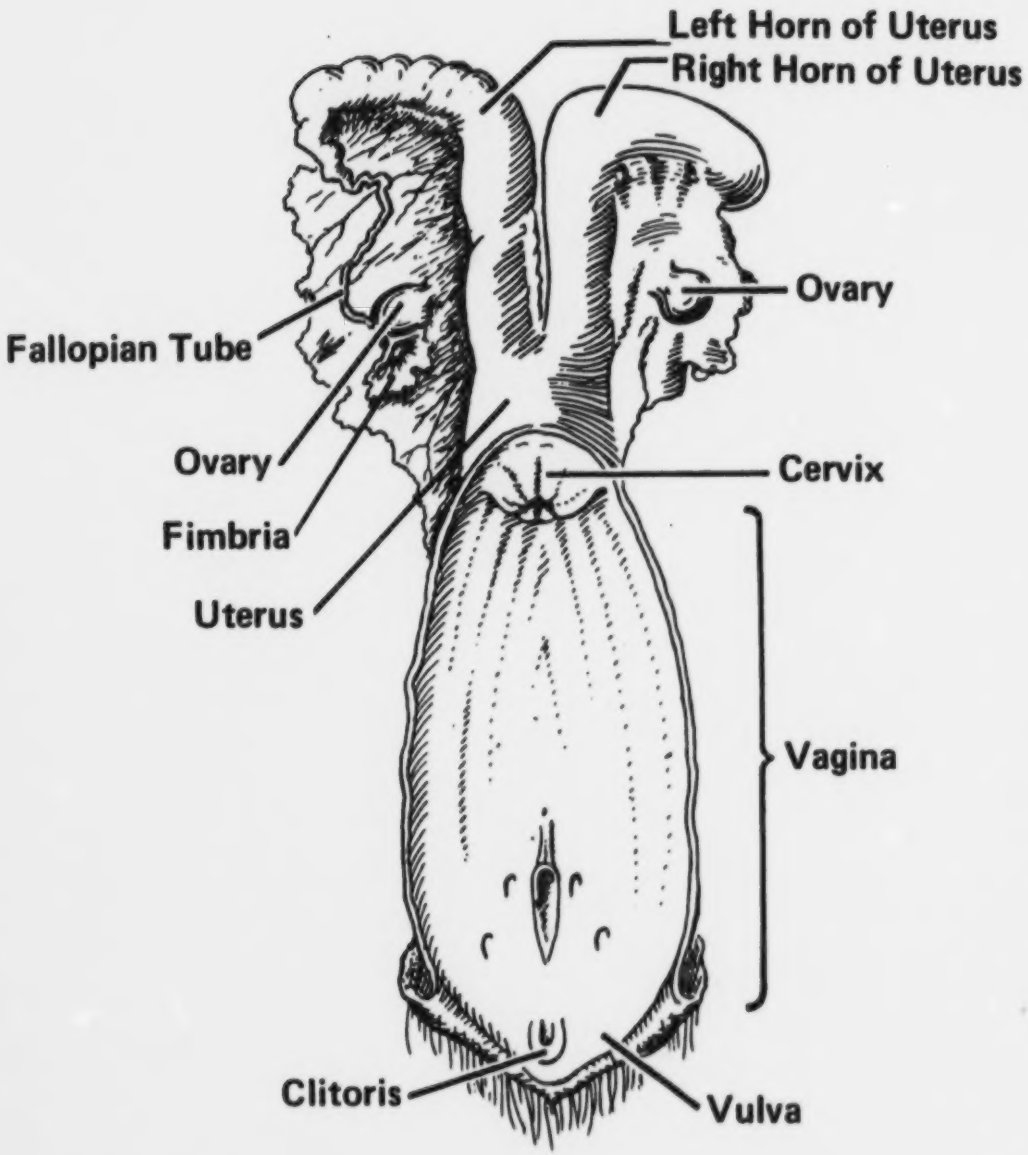
INSTRUCTOR'S RESOURCE PACKAGE - Animal Science
TRANSPARENCY MASTER 1 - CIMC - B-2 - 1

Components of the Reproductive Tract of a Cow



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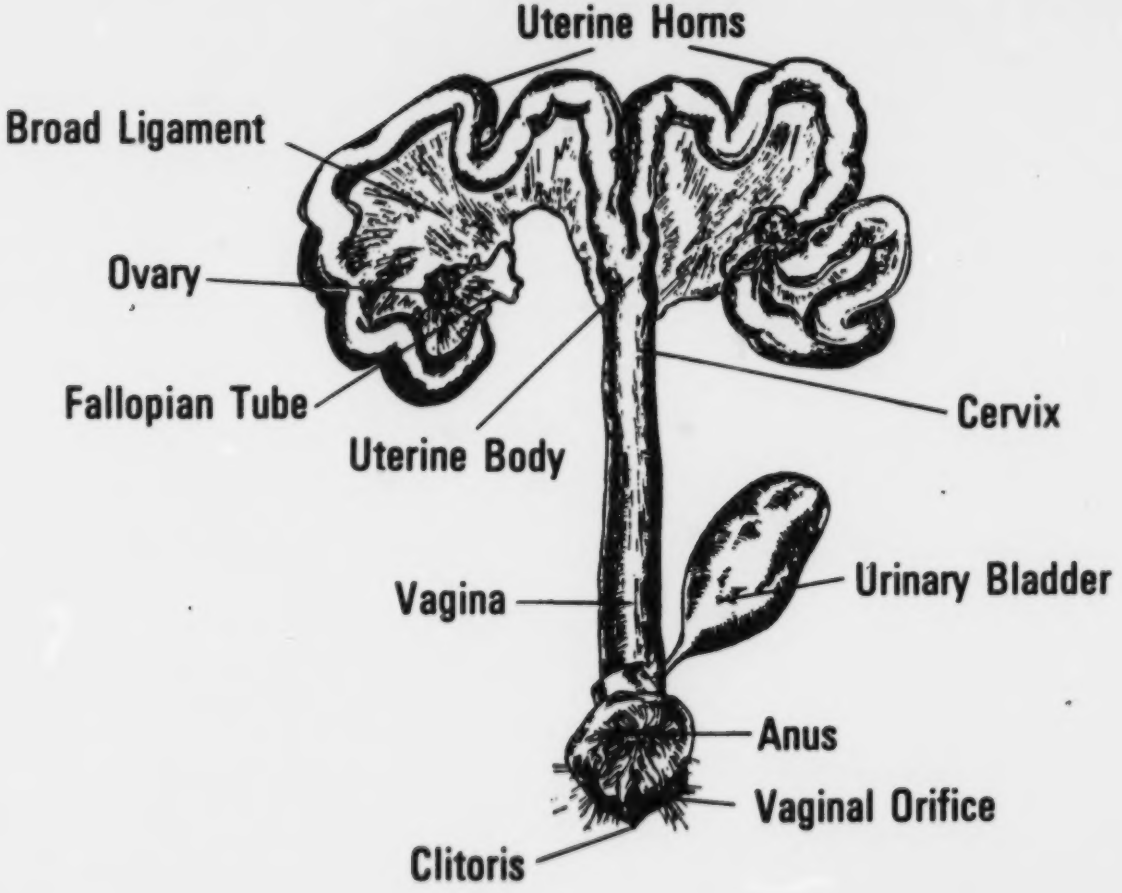
Components of the Reproductive Tract of a Sow



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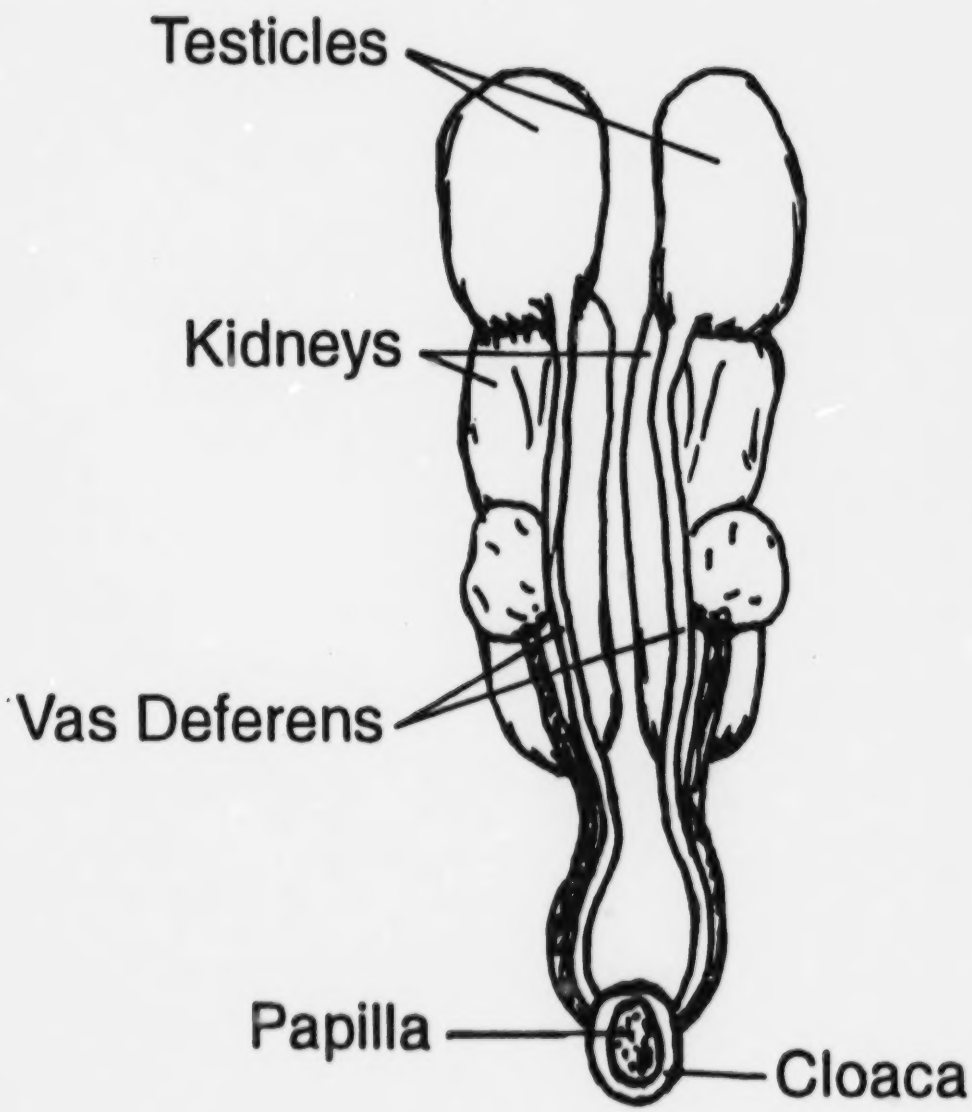
INSTRUCTOR'S RESOURCE PACKAGE - Animal Science
TRANSPARENCY MASTER 3 - CIMC - B-2 - 1

TM 3

The Male Poultry Reproductive System



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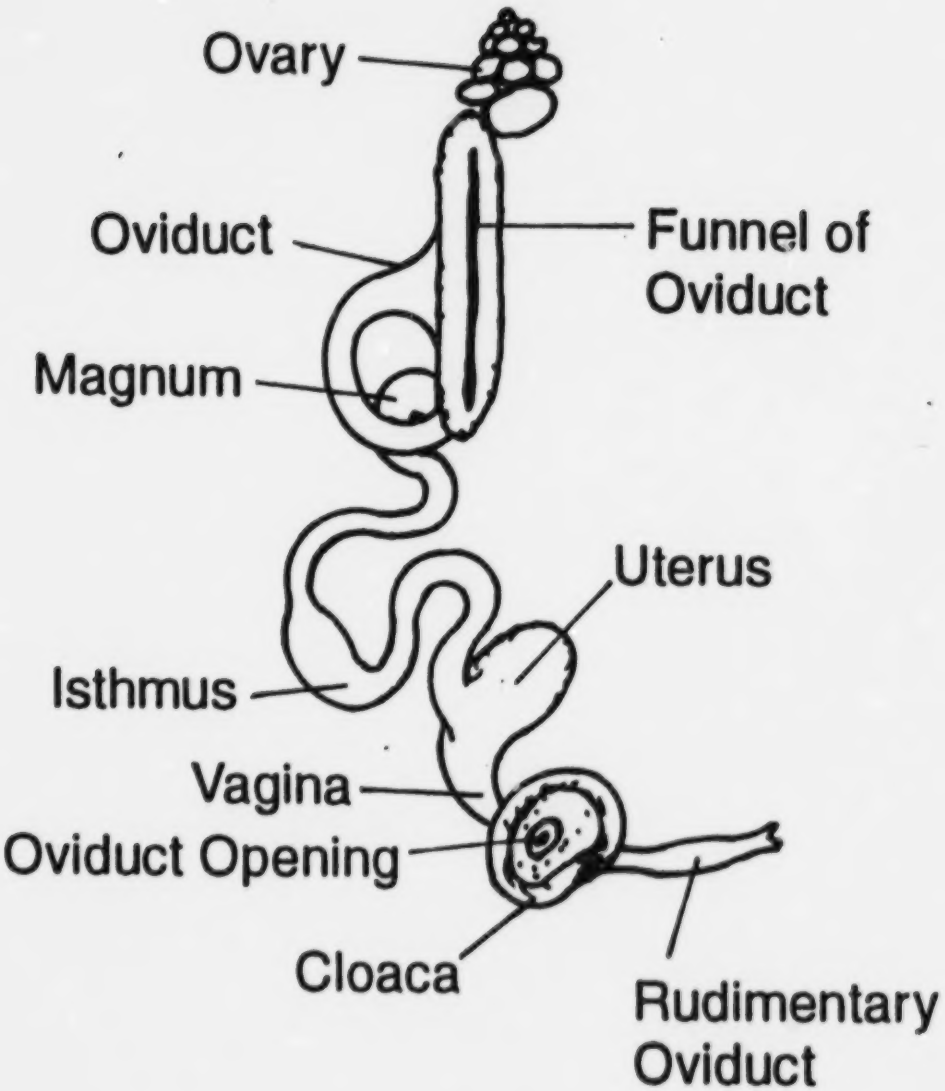
The Female Poultry Reproductive System



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WRITTEN TEST

REPRODUCTIVE ORGANS

B-2

Name _____ Score _____

OBJECTIVE 1

Choose the word or phrase to complete statements about reproduction. Write the letter of the answer in the blank.

____ 1. Reproduction is the method in which

A. mammals give birth
B. organisms produce offspring
C. a male and female mate to produce offspring
D. an infant is formed

____ 2. Farm animals reproduce through

A. sexual reproduction
B. dissexual reproduction
C. asexual reproduction
D. consexual reproduction

____ 3. Reproduction without the mating of a male and female is called

A. sexual reproduction
B. dissexual reproduction
C. asexual reproduction
D. consexual reproduction

____ 4. Sexual reproduction is

A. defined by the birth of a live animal
B. defined by verifying fertilization
C. limited to mammals
D. the union of male and female

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____ 5. Anestrus is the time when

A. the estrous cycle doesn't occur
B. the corpus luteum releases hormones
C. fertilization can occur
D. the follicles grow

____ 6. In cattle, ovulation occurs

A. during estrus
B. during the second stage of the estrous cycle
C. during the third stage of the estrous cycle
D. during the fourth stage of the estrous cycle

____ 7. In sheep, ovulation occurs

A. during estrus
B. during the second stage of the estrous cycle
C. during the third stage of the estrous cycle
D. during the fourth stage of the estrous cycle

____ 8. The optimum time for conception is

A. during anestrus
B. in the first stage of estrus
C. before ovulation
D. near the time of ovulation

____ 9. The animal(s) with the longest time in estrus is the

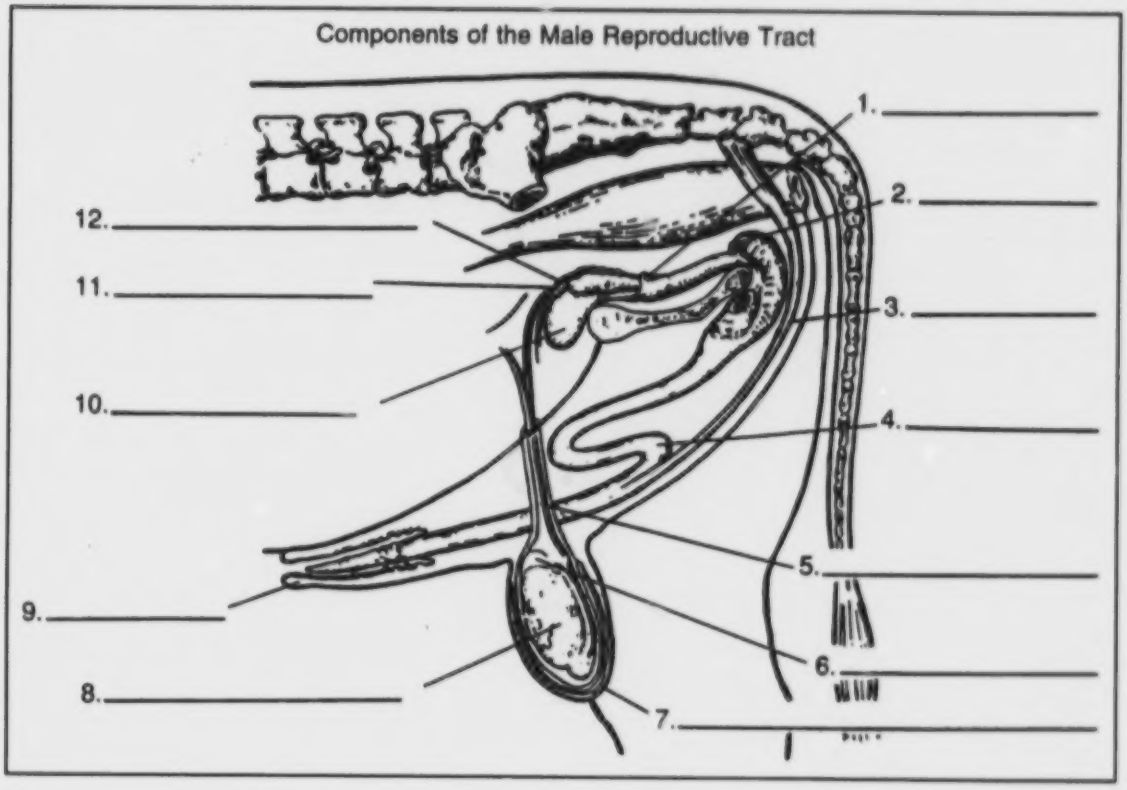
A. cow
B. ewe
C. sow
D. ewe and cow

____ 10. In the third stage of the estrous cycle,

A. the corpus luteum releases hormones that stimulate the uterus to prepare for pregnancy (diestrus)
B. the follicles grow rapidly to prepare for the next ovulation (proestrus)
C. the animal stands for breeding (estrus)
D. formation of the corpus luteum (metestrus)

May be photocopied for student use.

OBJECTIVE 2 | **Label components of the male reproductive tract.** Write the name of the component in the blank.



May be photocopied for student use.

OBJECTIVE 3

Match male reproductive organs to their functions. Write the letter of the answer in the blank.

A. ampulla	H. ovary	N. sheath
B. cervix	I. penis	O. spermatic cord
C. clitoris	J. prostate gland	P. testes
D. Cowpers gland	K. retractor penis muscle	Q. urethra
E. epididymis	L. scrotum	R. vagina
F. fallopian tube	M. seminal vesicle	S. vas deferens
G. fimbria		T. vulva

____ 1. the gland that secretes an alkaline material that cleans the urethra prior to ejaculation and produces a lubricating substance

____ 2. the external sac that houses the testes and maintains the proper temperature for sperm production and storage

____ 3. the fold of skin that provides an opening to the male reproductive tract

____ 4. the gland that secretes a mineral composition that becomes part of the semen

____ 5. the male gonad; produces spermatozoa

____ 6. the muscle that extends and retracts the penis during copulation

____ 7. the organ that transports sperm from the male to the female

____ 8. the structure that produces fructose

____ 9. secretes a substance high in fructose which serves as a nutrient for spermatozoa transport

____ 10. supports the testes

____ 11. the tube in which sperm is collected, matured, concentrated, and stored

____ 12. the tube that transports urine and sperm

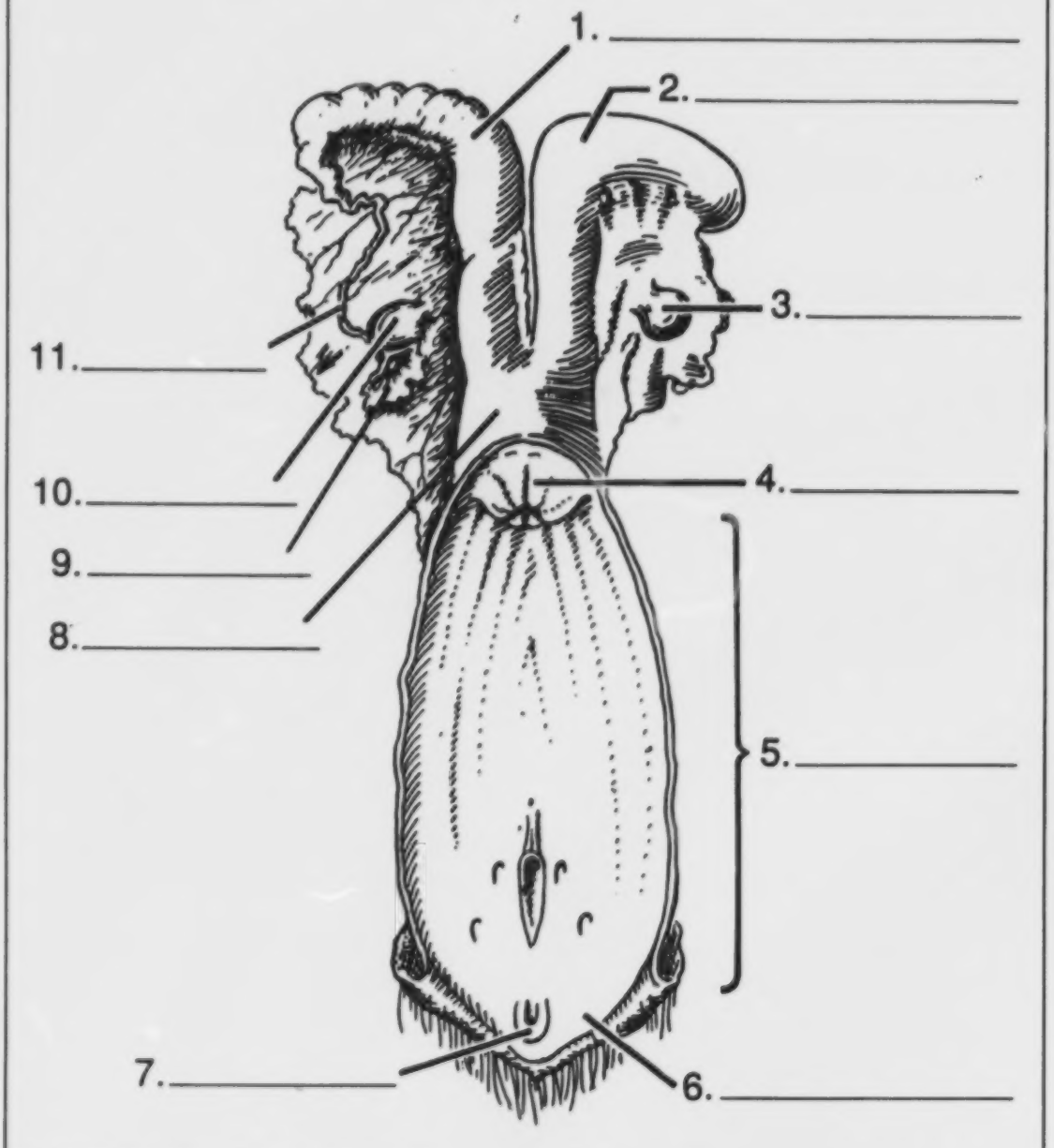
____ 13. the tubes that transport spermatozoa and serve as the storage place for spermatozoa until ejaculation

May be photocopied for student use.

OBJECTIVE 4

Label components of the female reproductive tract. Write the name of the component in the blank.

Components of the
Reproductive Tract of a Cow



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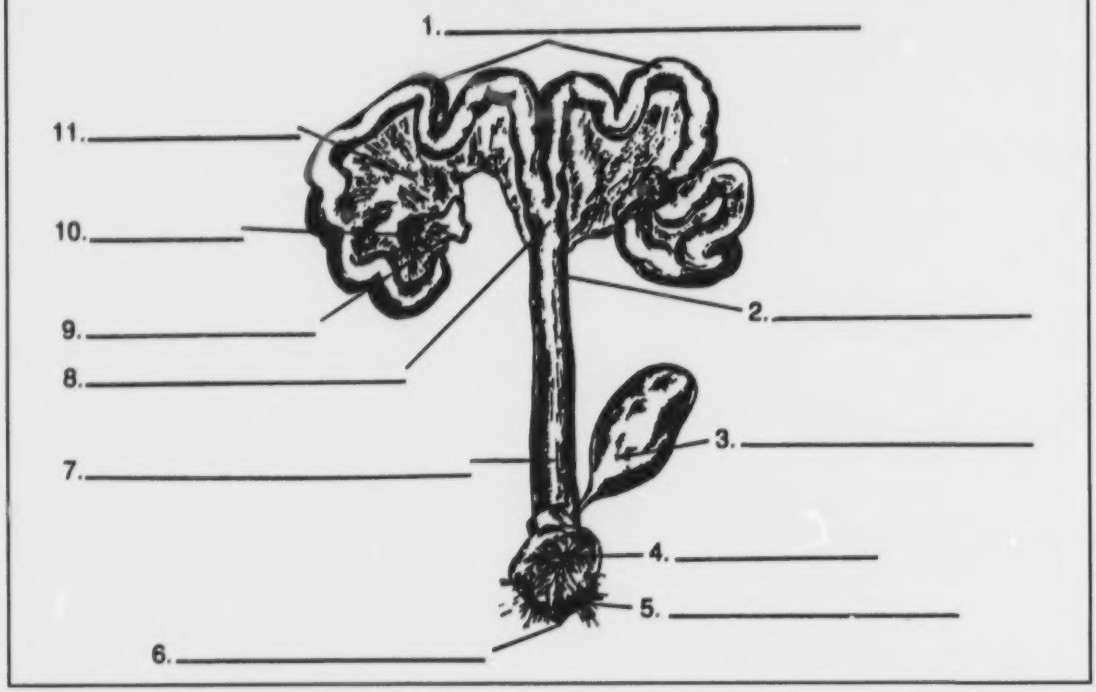
Components of the Reproductive Tract of a Sow



May be photocopied for student use.

OBJECTIVE 5

Match female reproductive organs to their functions. Write the letter of the answer in the blank.

A. alimentary canal	F. epididymis	K. papilla
B. ampulla	G. fallopian tube	L. sheath
C. cervix	H. fimbria	M. uterus
D. clitoris	I. horns of the uterus	N. vagina
E. cloaca	J. ovary	O. vas deferens
		P. vulva

____ 1. the channel receiving the male penis during copulation; the birth canal

____ 2. the tissue that forms a gateway between the vagina and uterus

____ 3. the female gonad; produces eggs

____ 4. the organ that increases a female's sexual excitement during copulation

____ 5. the opening to the fallopian tube which catches the egg as it is expelled from the ovary

____ 6. the outer opening of the female reproductive tract

____ 7. the passage between the ovary and uterus; the site of fertilization

____ 8. the place of fetal implantation and development; the womb

____ 9. the portion of the uterus in which the embryo develops into a fetus

May be photocopied for student use.

OBJECTIVE 6

Choose the word or phrase to complete statements about poultry reproductive systems. Write the letter of the answer in the blank.

____ 1. Sperm and seminal fluid are produced in the

A. testicles
B. alimentary canal
C. cloaca
D. papilla

____ 2. The sperm is transported by the vas deferens to the

A. testicles, then to the cloaca
B. alimentary canal, then to the testicles
C. papilla, then to the cloaca
D. cloaca, then to the papilla

____ 3. The sperm is transported to the female via the

A. testicles
B. papilla
C. cloaca
D. vas deferens

____ 4. The female has two ovaries and two fallopian tubes:

A. they function as a single organ
B. they function independently of each other
C. only the left ovary and fallopian tube function
D. only the right ovary and fallopian tube function

____ 5. The female receives sperm cells from the male and

A. stores them in the funnel
B. sends them to the ovaries
C. stores them in the magnum
D. covers them with a yolk secretion

____ 6. The yolk moves from the ovary to the

A. magnum
B. isthmus
C. funnel
D. uterus

May be photocopied for student use.

____ 7. In the magnum,

A. the white is secreted and deposited around the yolk
B. the shell is secreted and deposited around the white
C. the yolk is fertilized
D. the sperm cells are stored

____ 8. Processes in the magnum take approximately

A. one hour
B. three hours
C. five hours
D. seven hours

____ 9. The egg shell layers are secreted and deposited around the white and the yolk in the

A. magnum
B. isthmus
C. funnel
D. cloaca

____ 10. The egg rests in the uterus

A. until fertilization occurs
B. approximately seven hours
C. approximately twenty hours
D. while the white and shells are secreted

____ 11. After resting a short time in the vagina, the egg is

A. laid
B. fertilized
C. formed
D. transferred to the uterus

____ 12. The total time needed for egg production is

A. 17 to 20 hours
B. 21 to 24 hours
C. 25 to 27 hours
D. 28 to 30 hours

May be photocopied for student use.

____ 13. Fertilization occurs in the

A. magnum
B. isthmus
C. funnel
D. cloaca

OBJECTIVE 7 **Evaluated on the Assignment Sheet.**

OBJECTIVE 8 **Match hormones to their functions.** Write the letter of the answer in the blank.

A. antigen	F. FSH	K. oxytocin
B. BGH	G. inhibin	L. progesterone
C. estrogens	H. insulin	M. prolactin
D. TSH	I. lactogen	N. relaxin
E. fimbria	J. LH	O. testosterone

____ 1. the female hormone that takes the animal out of heat when ovulation is completed, stimulates the mammary gland development, and maintains pregnancy

____ 2. inhibits the production of FSH

____ 3. the male sex hormone responsible for male temper, odor, appearance, sperm production, and maintenance of the male reproductive system

____ 4. the set of female hormones that trigger estrus behavior, control the female reproductive cycle, and control development of mammary glands and secondary sex characteristics

____ 5. stimulates estrogen production and follicle growth in females; stimulates sperm production in males

____ 6. stimulates follicle maturation, releases of ovum, and production of corpus luteum in females; stimulates testosterone production in males

____ 7. stimulates mammary gland development and milk production

____ 8. stimulates muscle contractions in the female reproductive tract; stimulates milk production

May be photocopied for student use.

____ 9. stimulates softening of the uterus for fetal development and softening of the cervix at birth

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LAP SHEET	ARTIFICIAL INSEMINATION	B-3

Check the blank as you complete each step.

1. Take	___	the pretest provided by your instructor. Have your instructor evaluate your completed test. After your test has been evaluated, follow your instructor's recommendations.
2. Read	___	the introduction, unit objective, and specific objectives.
3. Do	___	the focus assignments.
4. Stop	___	and have your instructor evaluate your work from the focus assignment. After your work has been evaluated, follow your instructor's recommendations.
5. Study	___	the Information Sheet, objective 1.
6. Ask	___	your instructor to show you Transparencies 1 and 2.
Optional Watch	___	a video on artificial insemination.
Optional: Visit	___	a artificial insemination facility to view semen collection, semen processing, and artificial insemination.
7. Study	___	the Information Sheet, objective 2.
8. Ask	___	your instructor to display artificial insemination equipment.
Optional: Visit	___	an artificial insemination company to observe how AI equipment is used.
Optional: Ask	___	your instructor to provide information on schools that offer AI courses.
9. Study	___	the Information Sheet, objective 3.

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Optional: Ask	___	a breeder to relate his or her personal experience with factors that affect conception rates.
10. Study	___	the Information Sheet, objective 4.
Optional: Ask	___	your instructor to provide straws, ampules, and semen samples. Compare color, consistency, smell, and other characteristics.
11. Study	___	the Information Sheet, objective 5.
Optional: Examine	___	sperm under a microscope and identify the parts.
12. Study	___	the Information Sheet, objective 6.
Optional: Research	___	the current cost of producing one semen straw and the selling price of straws from various bulls.
Optional: Write	___	to CSS (Certified Semen Service, a division of the National Association of Animal Breeders) requesting information on AI.
Optional: Research	___	where AI technician courses are available and what they cost.
Optional: Write	___	to breed associations requesting information on EPDs (Expected Progeny Differences).
13. Study	___	the Information Sheet, objective 7.
Optional: Ask	___	your instructor to prepare a demonstration on the different methods of thawing semen.
14. Do	___	the Assignment Sheet.
15. Stop	___	and have your instructor evaluate your work from the Assignment Sheet. After your work has been evaluated follow your instructor's recommendations.

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16.	**Study**	___ the Information Sheet, objective 9.
17.	**Ask**	___ your instructor to show you Transparencies 3 and 4.
18.	**Study**	___ the Information Sheet, objective 10.
	Optional: Visit	___ with an AI technician to discuss pregnancy success rates and factors that affect successful fertilization.
19.	**Study**	___ the Information Sheet, objective 11.
	Optional: Research	___ reasons why ovulation may fail or be delayed and what types of nutritional deficiencies can interrupt the estrous cycle.
20.	**Study**	___ the Information Sheet, objective 12.
	Optional: Visit	___ an AI facility to observe standard practices.
21.	**Study**	___ the Information Sheet, objective 13.
22.	**Ask**	___ your instructor to show you Transparency 5.
	Optional: Talk	___ with an AI technician about insemination errors.
23.	**Ask**	___ your instructor to demonstrate the guidelines and procedures in the Job Sheet. Use the Job Sheet to follow along. Pay careful attention to any guidelines, cautions, and warnings.
24.	**Practice**	___ the procedures demonstrated by your instructor. Use the Job Sheet as a guide.
25.	**Stop**	___ and have your instructor evaluate your work from the Job Sheet. After your work has been evaluated, follow your instructor's recommendations.
	Optional: Ask	___ your instructor if he or she is willing to demonstrate and guide you through the procedures for inseminating a cow, as provided in the Handout.

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26. Take

___ the posttest provided by your instructor. Have your instructor evaluate your completed test. After your test has been evaluated, follow your instructor's recommendations.

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Speculum Method of Artificial Insemination

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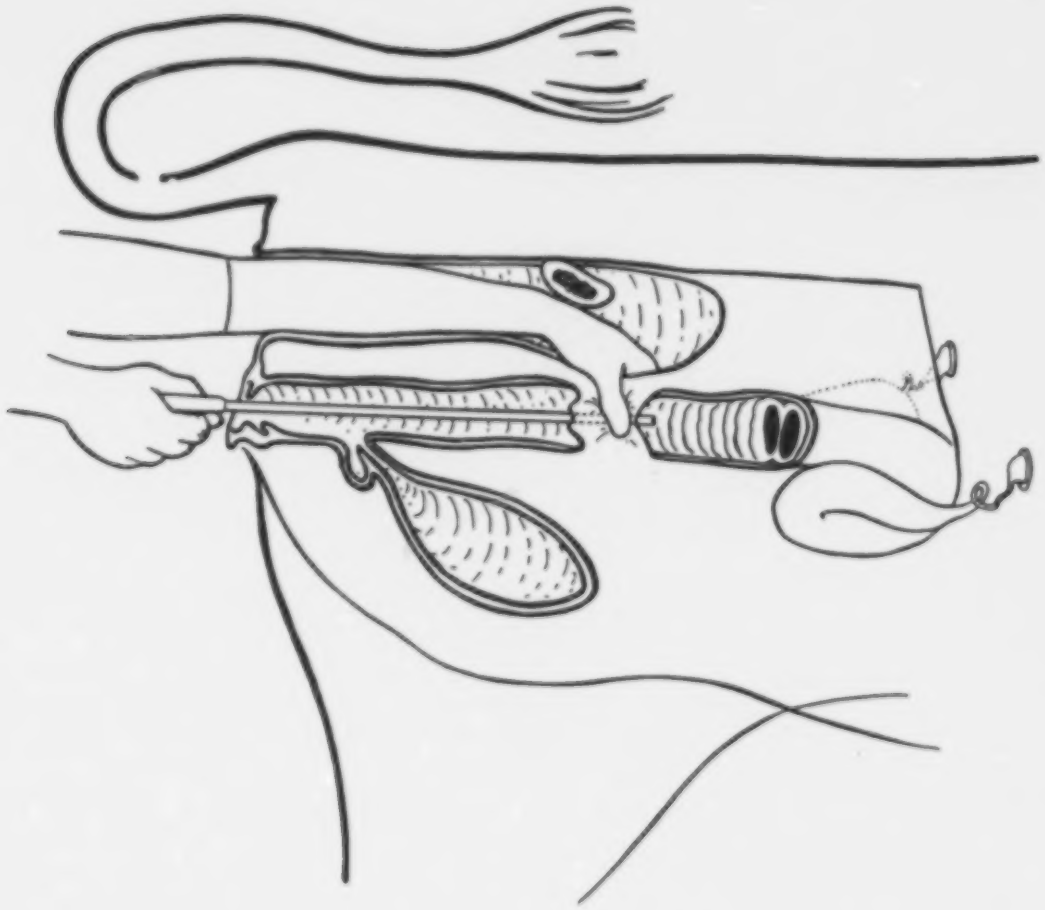
INSTRUCTOR'S RESOURCE PACKAGE - Animal Science
TRANSPARENCY MASTER 1 - CSMC - 8-3 - 1

Retrovaginal Method of Artificial Insemination



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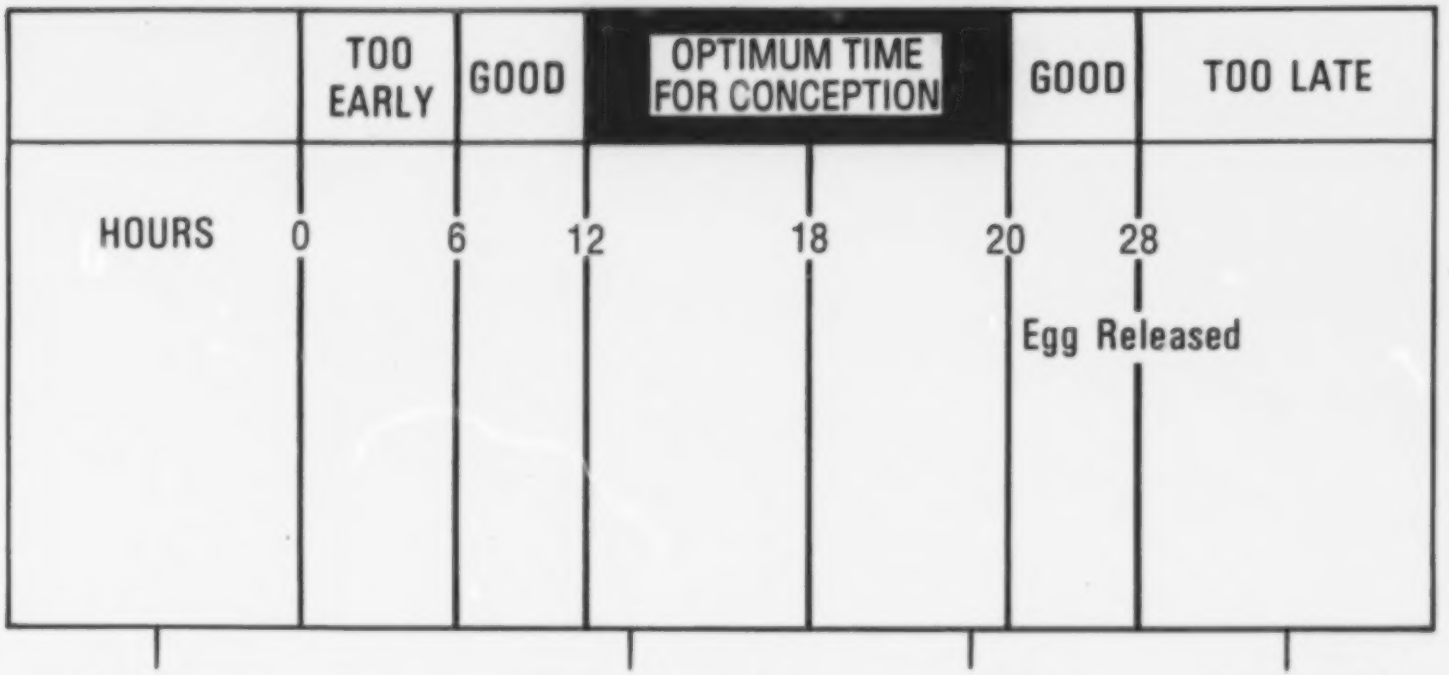
INSTRUCTOR'S RESOURCE PACKAGE - Animal Science
TRANSPARENCY MASTER 2 - CIMC - B-3 - 1

Estrous Cycle - Cow



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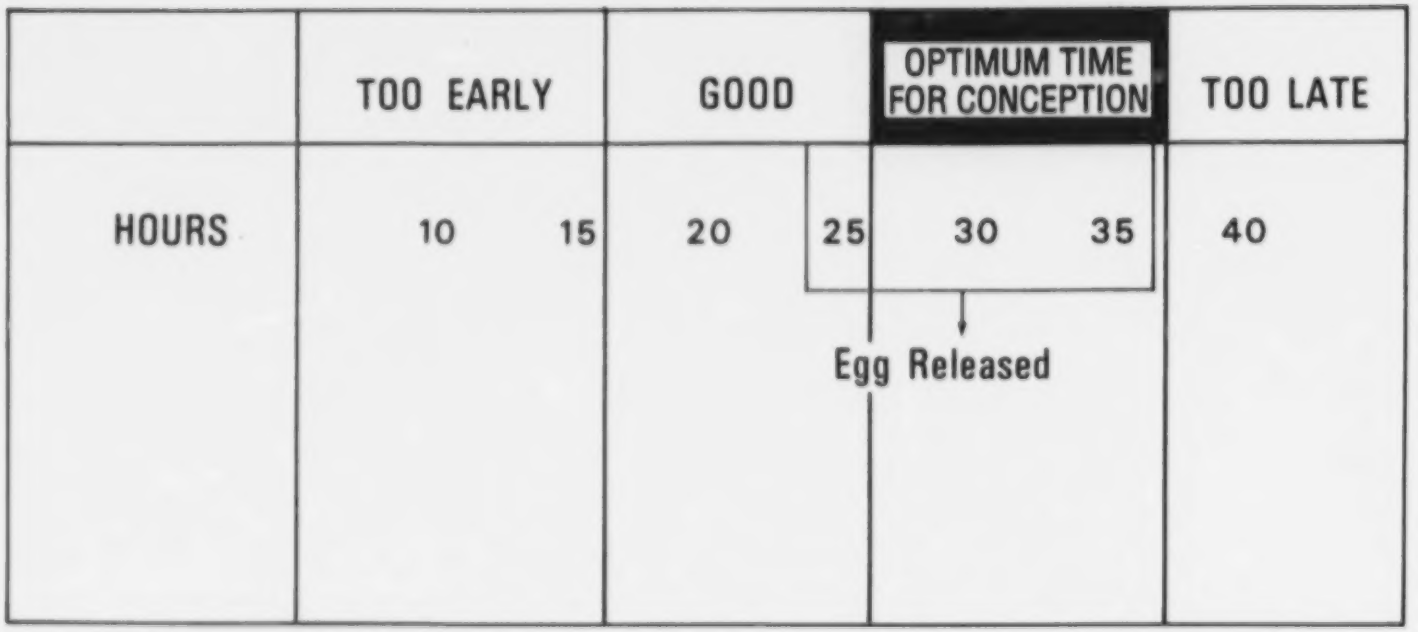
INSTRUCTOR'S RESOURCE PACKAGE - Animal Science
TRANSPARENCY MASTER 3 - CIMC - 8-3 - 1

Estrous Cycle - Sow



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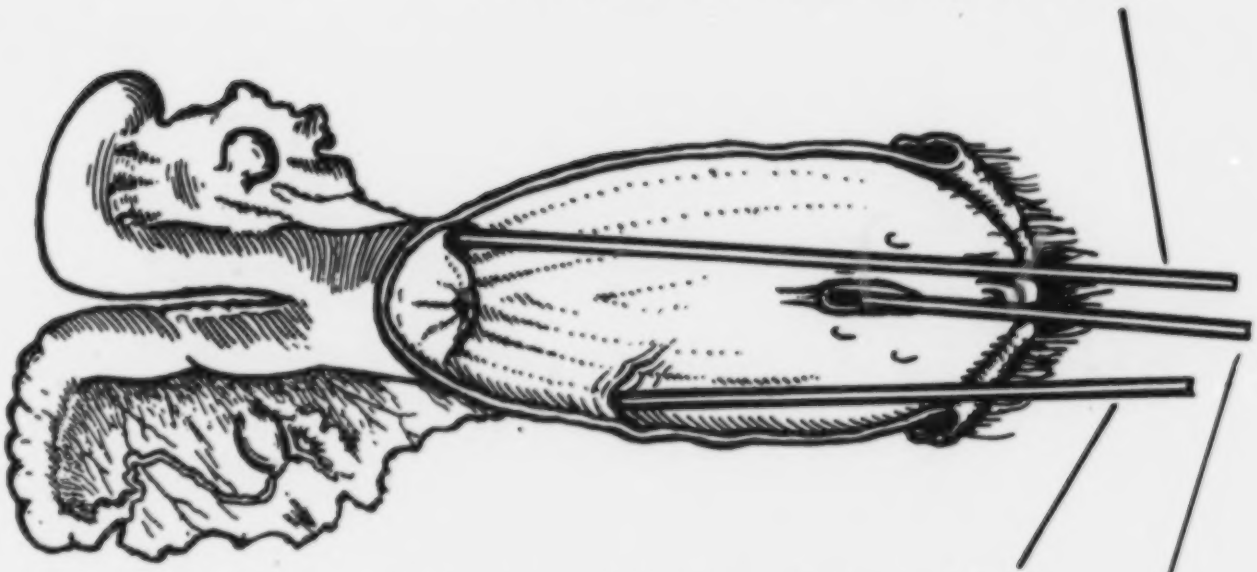
INSTRUCTOR'S RESOURCE PACKAGE - Animal Science
TRANSPARENCY MASTER 4 - CIMC - B-3 - 1

Errors in Placing the Inseminating Tube



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INSTRUCTOR'S RESOURCE PACKAGE - Animal Science
TRANSPARENCY MASTER 5 - CIMC - B-3 - 1

WRITTEN TEST

ARTIFICIAL INSEMINATION

B-3

Name _____ Score _____

OBJECTIVE 1

Choose the word or phrase to complete statements about artificial insemination. Write the letter of the correct answer in the blank.

_____ 1. The primary purpose of artificial insemination is to

A. eliminate the cost of maintaining a bull
B. reduce the spread of sexually transmitted diseases
C. increase the use of heat synchronization programs
D. improve the quality of the herd

_____ 2. Artificial insemination is advantageous because AI increases safety, reduces or eliminates the cost of keeping sires, enables the long term storage of semen, and

A. reduces close supervision of females
B. reduces the spread of disease
C. requires minimal equipment
D. uses diluted semen

_____ 3. Artificial insemination requires

A. a skilled technician
B. specialized equipment
C. sterile equipment
D. all of the above

_____ 4. Raw semen is diluted to

A. enable proper freezing
B. ensure that each straw receives semen
C. provide nutrients to the sperm
D. improve the chances that a female will be fertilized

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____ 5. The artificial penis is used to artificially inseminate

A. cows
B. ewes
C. sows
D. none of the above

____ 6. The retrovaginal technique is used to inseminate

A. cows
B. ewes
C. sows
D. none of the above

____ 7. The speculum technique is used to inseminate

A. cows
B. ewes
C. sows
D. none of the above

____ 8. Artificial insemination has become necessary because body size makes natural reproduction difficult in

A. sheep
B. dairy cattle
C. beef cattle
D. turkeys

____ 9. The majority of artificial insemination using fresh semen is performed on

A. sheep
B. dairy cattle
C. turkeys
D. swine

____ 10. Historically, the beef industry placed barriers on artificial insemination because

A. AI is impractical in range cattle
B. AI would impact bull values
C. the technology to freeze beef cattle semen was in its infancy
D. beef producers were increasing the quality of their herds through natural service

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OBJECTIVE 2

Describe how AI equipment is used. Write the descriptions of how equipment is used in the blanks.

1. **nitrogen chest** – _____

_____

2. **thaw box** – _____

_____

3. **inseminating tube** – _____

_____

4. **polybulb** – _____

_____

5. **straw clippers** – _____

_____

6. **straw** – _____

_____

7. **ampule** – _____

_____

8. **inseminating tube** – _____

_____

9. **speculum** – _____

_____

OBJECTIVE 3

List factors that contribute to poor conception rates. List five factors that contribute to poor conception rates.

_____

_____

_____

May be photocopied for student use.

OBJECTIVE 4

Choose the word or phrase to complete statements about semen. Write the letter of the correct answer in the blank.

____ 1. Bull semen pH ranges from

A. 4.5 to 5.6
B. 8.5 to 9.0
C. 6.5 to 6.9
D. 2.6 to 3.4

____ 2. All of the following affect the concentration of semen **EXCEPT**

A. frequency of ejaculation
B. amount of stimulation prior to ejaculation
C. age and health of animal
D. season of the year

____ 3. An ejaculation produces desirable semen if the semen

A. can settle at least 50% of females
B. has a volume of six cubic centimeters
C. has good density, and milky white color
D. is clear and has good motility

____ 4. Semen that can settle most females is

A. exceptional semen
B. questionable semen
C. good semen
D. satisfactory semen

____ 5. You would not want to use semen that has a single or combination of low values for density, mobility, and

A. pH
B. volume
C. rate of movement
D. color

May be photocopied for student use.

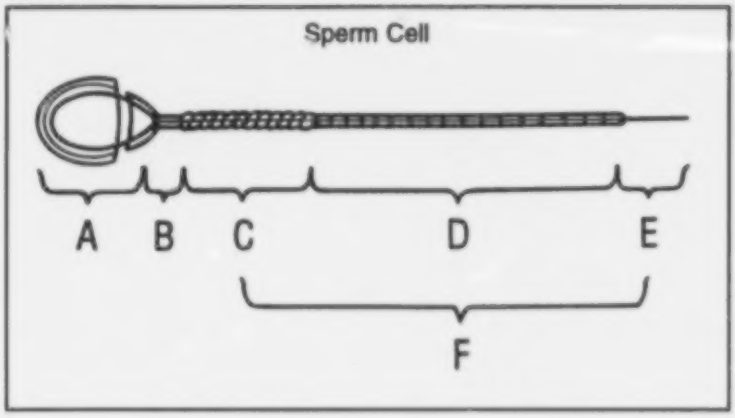
____ 6. Viable semen is semen that has

A. good mobility after thawing
B. good color
C. a volume greater than seven cubic centimeters
D. been collected during the fall of each year

OBJECTIVE 5

Choose the word or phrase to complete statements about semen cells. Write the letter of the correct answer in the blank.

FIGURE 1



Questions 1-4 refer to Figure 1.

____ 1. Part D is the

A. middle piece
B. main piece
C. neck
D. tail

____ 2. The part that contains the genetic material is

A. part A
B. part B
C. part F
D. part D

____ 3. The part that serves as a storage house for energy is

A. part A
B. part B
C. part C
D. part F

May be photocopied for student use.

____ 4. The part that propels the sperm is

A. part C
B. part D
C. part E
D. part F

____ 5. Characteristics of abnormal sperm include tailless head, two tails, two heads, and

A. three tails
B. yellow color
C. pear-shaped head
D. elongated head

OBJECTIVE 6

Choose the word or phrase to complete statements about standards and sources. Write the letter of the correct answer in the blank.

____ 1. In the U.S., semen is stored almost exclusively in

A. ampules
B. straws
C. both ampules and straws
D. container varies among AI companies

____ 2. The primary concern for the storage container is

A. the amount of semen that is stored
B. the cost of each unit
C. the ease of use
D. the survivability of semen when thawed

____ 3. To learn proper techniques, AI technicians take, at a minimum, a

A. two-day course
B. four-day course
C. ten-day course
D. one semester course

____ 4. CSS members are inspected annually for cleanliness, procedures, disease control, and

A. insemination success rate
B. profitability
C. worker injuries
D. record keeping

May be photocopied for student use.

____ 5. The market for semen is

A. growing quickly in most countries except third-world countries
B. confined to the United States
C. global
D. confined to developed countries

____ 6. The cost of a straw of semen depends on

A. the production costs
B. the physical characteristics of the bull
C. the number of straws produced per ejaculation
D. the Expected Progeny Difference (EPD) of the bull

OBJECTIVE 7

Match methods of thawing semen in ampules and straws to their descriptions. Write the letter of the correct answer in the blank.

A. ampule, hot bath
B. ampule, ice bath
C. ampule, no thaw
D. both ampule and straw, hot bath
E. both ampule and straw, ice bath
F. both ampule and straw, no thaw
G. neither ampule or straw (incorrect technique)
H. straw, hot bath
I. straw, ice bath
J. straw, no thaw

____ 1. Place the semen container in a water bath at 90°C for one minute, then inseminate the female.

____ 2. Place the semen container in a water bath at 110°F for 40 seconds, then inseminate the female.

____ 3. Place the semen container in a water bath at 2.8°C for a full ten minutes, then inseminate the female.

____ 4. Take the semen straight from the nitrogen tank and inseminate the female.

____ 5. Place the semen container in a water bath at 90° to 95°F for one minute, then inseminate the female.

____ 6. Place the semen container in a water bath at 37°C for ten minutes, then inseminate the female.

OBJECTIVE 8

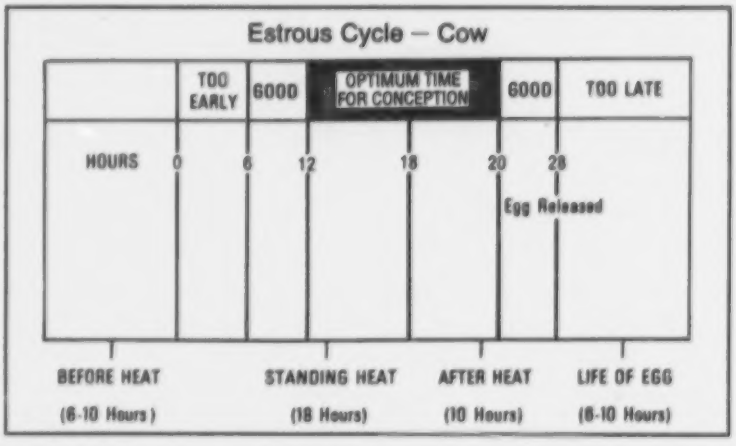
Evaluated on the Assignment Sheet.

May be photocopied for student use.

OBJECTIVE 9

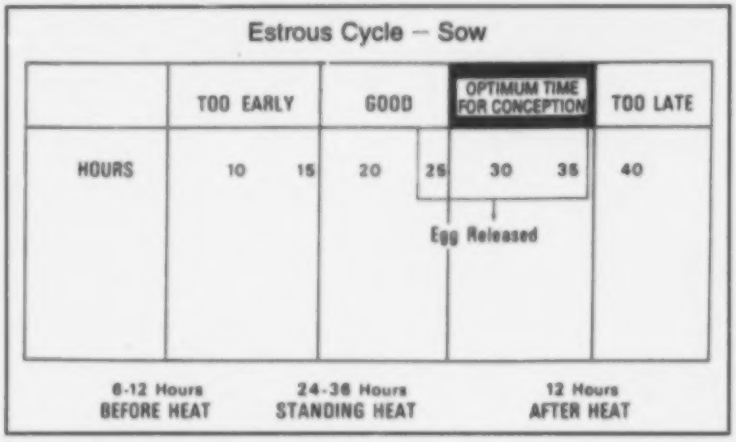
Discuss the importance of the estrous cycle in AI. Answer the following questions.

1. Mary, a prize cow, starts showing signs of heat at 9:00 p.m. on March 6th. When is the optimal time to artificially inseminate Mary, and why?



May be photocopied for student use.

2. Carol is looking forward to artificially inseminating her sow, Sally. Sally shows the first signs of heat at 9:00 a.m. on July 10th. When should Carol inseminate Sally, and why?



OBJECTIVE 10

Match the percentage of pregnancies expected to the number of services when using AI in cattle. Write the letter of the correct answer in the blank.

A.	55-70%	F.	75-85%
B.	65-70%	G.	80-85%
C.	65-80%	H.	85-95%
D.	70-75%	I.	90-95%
E.	70-85%	J.	90-100%

____ 1. The percentage of pregnancies expected after the first service.

____ 2. The percentage of pregnancies expected after the second service.

____ 3. The percentage of pregnancies expected after the third service.

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OBJECTIVE 11

State reasons cattle do not settle. State six reasons why cows do not settle.

_____

_____

_____

_____

_____

_____

_____

_____

OBJECTIVE 12

State standard practices for using AI. State six standard practices for using AI.

_____

_____

_____

_____

_____

_____

_____

_____

_____

May be photocopied for student use.

OBJECTIVE 13

List errors in placing the inseminating tube in a cow. List five errors in placing the inseminating tube in a cow.

_____

_____

_____

_____

_____

OBJECTIVE 14

Evaluated on the Job Sheet.

May be photocopied for student use.

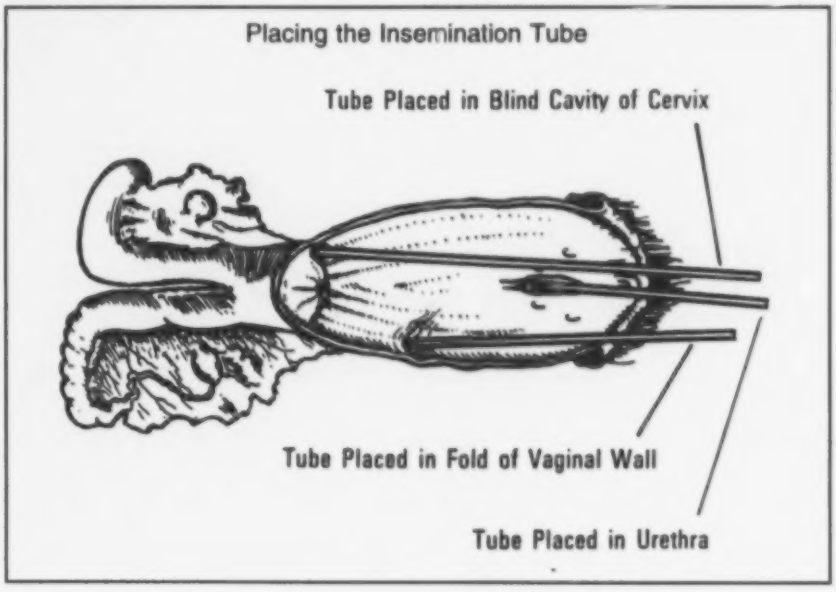
Inseminate a cow.

EQUIPMENT AND SUPPLIES

- Nitrogen chest
- Straw with semen
- Thaw box
- Ice water
- Thermometer
- Disposable glove
- Inseminating tube
- Straw clippers
- Lubricant
- Chute
- Cow showing signs of estrus (heat)
- Soap, warm water, and rags or paper towels

☛ **NOTE:** This Handout outlines the procedure for artificial insemination using an inseminating tube (the most common method). The procedure varies slightly when using an inseminating gun.

FIGURE 1


Placing the Insemination Tube
Tube Placed in Blind Cavity of Cervix
Tube Placed in Fold of Vaginal Wall
Tube Placed in Urethra

May be photocopied for student use.

1. Place the cow into a chute.

2. Clean and disinfect the rectal and vulva areas with soap and water, using rags or paper towels.

3. Remove your jewelry and scrub your hands and arms thoroughly with soap and water.

4. Remove the straw from the nitrogen chest and place it into the thaw box. (See objective 7 for the proper time and temperature for thawing.)

5. Place a plastic glove on your left hand. If you are left-handed, place the glove on your right hand.

6. Snip off the end of the straw and place the straw into the inseminating tube.

7. Wet the plastic glove and apply the lubricant.

8. Grasp the cow's tail with your right hand and move the tail to the left side of the cow.

⚠ **WARNING:** DAMAGE TO THE COW CAN RESULT FROM IMPROPER INSERTION. Use caution when inserting your hand and arm.

---

9. Insert your left hand and arm into the cow's rectum to a depth of approximately six inches.

10. Remove feces as needed.

⚠ **WARNING:** YOU CAN DAMAGE THE COW'S REPRODUCTIVE ORGANS. Hold the cervix gently to avoid causing injury.

---

11. Locate the cervix with your left hand and hold in your palm.

☞ **NOTE:** If the cow is straining to expel your arm, she will relax if you wait a minute.

May be photocopied for student use.

WARNING: IMPROPER INSERTION OF THE TUBE CAN DAMAGE THE COW'S REPRODUCTIVE ORGANS. Insert the inseminating tube carefully to avoid causing injury.

12. Insert the inseminating tube slowly into the vulva with your right hand. Locate the cervical opening and guide the inseminating tube gently through the three rings of the cervix.

    ☞ **NOTE:** The inseminating tube should be inserted at a slight upward angle to reduce the chance of entering the urethra.

13. Deposit the semen at the end of the cervix by pressing the plunger on the end of the inseminating tube.

14. Remove the inseminating tube slowly from the vagina.

15. Remove your hand from the cow's rectum.

16. Locate and squeeze the cow's clitoris between your thumb and your finger.

    ☞ **NOTE:** Squeezing the clitoris has been found to improve the conception rate.

17. Release the animal.

18. Clean and put away your tools and clean the work area.

May be photocopied for student use.

LAP SHEET	FERTILITY AND PREGNANCY TESTING	B-4

Check the blank as you complete each step.

1. Take	___ the pretest provided by your instructor. Have your instructor evaluate your completed test. After your test has been evaluated, follow your instructor's recommendations.
2. Read	___ the introduction, unit objective, and specific objectives.
3. Do	___ the focus assignments.
4. Stop	___ and have your instructor evaluate your work from the focus assignment. After your work has been evaluated, follow your instructor's recommendations.
5. Study	___ the Information Sheet, objective 1.
6. Ask	___ your instructor to show you Transparency 1.
7. Study	___ the Information Sheet, objective 2.
8. Optional: Review	___ the sow and ewe reproductive tracts from Unit B-3, "Artificial Insemination."
Optional: Ask	___ your instructor to display the equipment used for various pregnancy testing techniques.
Optional: Visit	___ a clinic to observe techniques.
9. Do	___ Assignment Sheet 1, objective 3.
Optional: Ask	___ your instructor to recommend additional sources for information to include in your charts and make texts and animal science references available.
Optional: Watch	___ a video on pregnancy testing.

May be photocopied for student use.

10. **Stop**	___	and have your instructor evaluate your work from the Assignment Sheet. After your work has been evaluated, follow your instructor's recommendations.
11. **Study**	___	the Information Sheet, objective 4.
Optional: Talk	___	with a technician or vet about the relative ease of determining pregnancy using the four indicators.
12. **Ask**	___	your instructor to demonstrate the guidelines and procedures in the Job Sheet. Use the Job Sheet to follow along. Pay careful attention to any guidelines, cautions, and warnings.
13. **Practice**	___	the procedures demonstrated by your instructor. Use the Job Sheet as a guide.
14. **Stop**	___	and have your instructor evaluate your work from the Job Sheet. After your work has been evaluated, follow your instructor's recommendations.
15. **Study**	___	the Information Sheet, objective 6.
16. **Ask**	___	your instructor to show you Transparency 2.
Optional: Talk	___	with a technician or vet about their experiences in determining the stages of pregnancy.
Optional: Examine	___	preserved fetuses in different stages of development.
Optional: Visit	___	a local ranch and perform rectal palpations on cows in various stages of pregnancy.
Optional: Watch	___	a video on the stages of pregnancy and fetal development.
17. **Study**	___	the Information Sheet, objective 7.
18. **Optional: Ask**	___	your instructor to provide samples of semen. View these samples under the microscope.

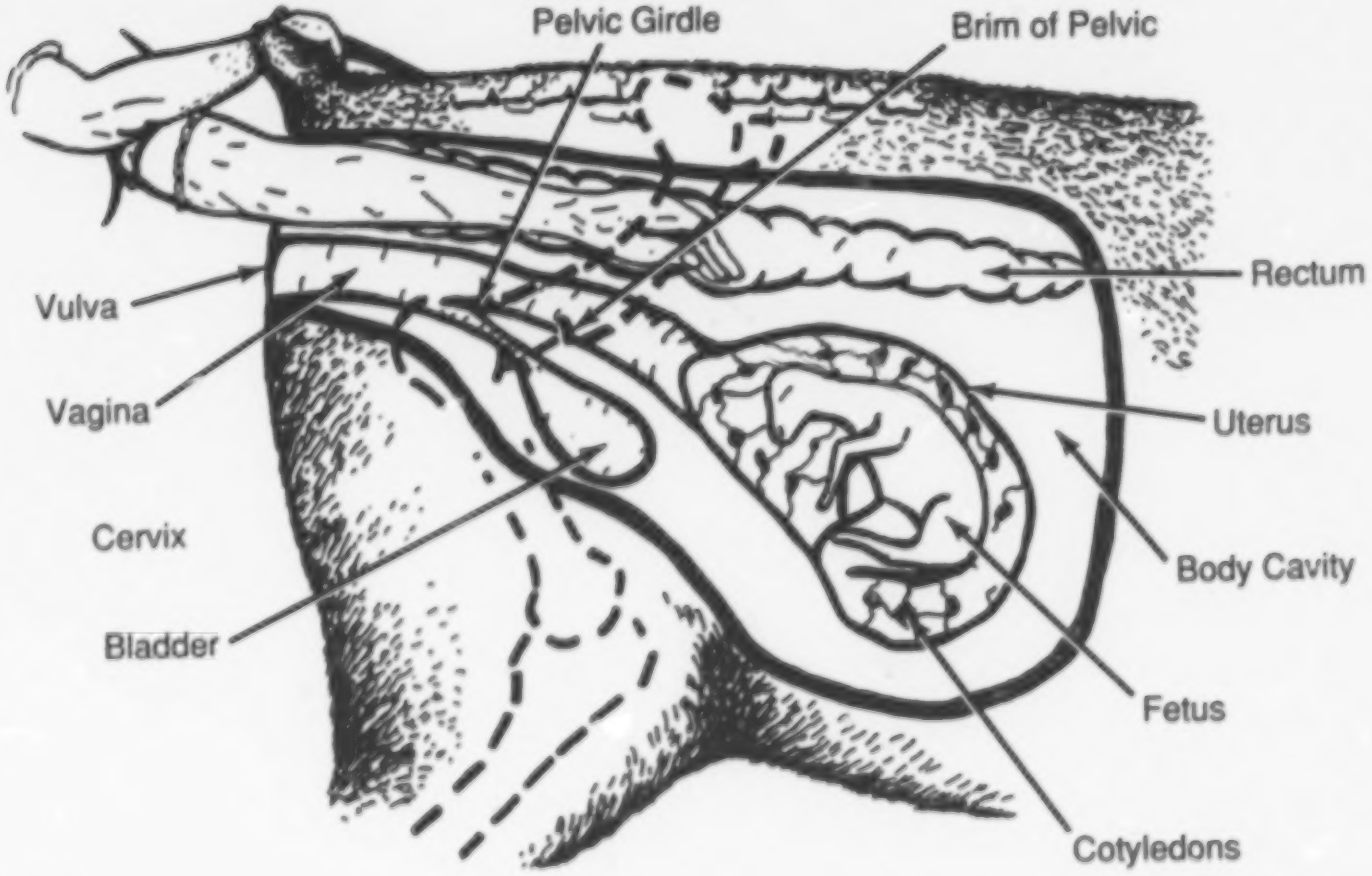
May be photocopied for student use.

19. Take

___ the posttest provided by your instructor. Have your instructor evaluate your completed test. After your test has been evaluated, follow your instructor's recommendations.

May be photocopied for student use.

Parts of a Cow's Reproductive Tract



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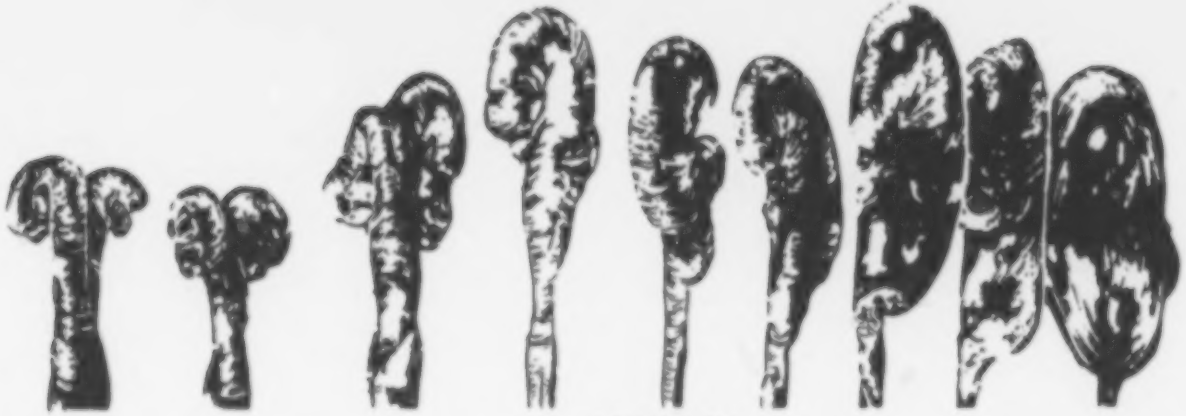
INSTRUCTOR'S RESOURCE PACKAGE - Animal Science
TRANSPARENCY MASTER 1 - CSMC - B-4 - 1

Stages of Pregnancy (Cow)



MONTHS

Open 1 2 3 4 5 6 7 8

DAYS 30-45 80-100 120-150 160-180 210-240

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INSTRUCTOR'S RESOURCE PACKAGE - Animal Science
TRANSPARENCY MASTER 2 - CIMC - B-4 - 1

TM 2

WRITTEN TEST

FERTILITY AND PREGNANCY TESTING

B-4

Name _____ Score _____

OBJECTIVE 1

Choose the word or phrase to complete statements about fertility and pregnancy testing. Write the letter of the correct answer in the blank.

____ 1. Pregnancy testing provides the means to

A. determine the sex of the offspring
B. rebreed non-pregnant females
C. check fertility
D. cull non-productive males

____ 2. Fertility testing enables you to select males, increase the offspring crop, and

A. increase the value of each offspring
B. shorten the birthing season
C. treat infertility
D. prevent infertility

____ 3. Fertility testing also enables you to select males, increase your profits, and

A. cull infertile females from your stock
B. cull infertile males from your stock
C. control the crop of offspring
D. extend the birthing season

____ 4. The cow's reproductive tract includes the uterus, the vulva, the vagina, and the

A. rectum
B. bladder
C. cervix
D. fetus

May be photocopied for student use.

____ 5. Purebred animals will bring more money if they are known to be

A. sterile
B. open
C. in heat
D. carrying a fetus

____ 6. The disadvantages of pregnancy testing include health risk to the dam and fetus and

A. birthing season is too short
B. labor and equipment costs
C. delays breeding cycle
D. can reduce weight of the offspring

____ 7. After completing pregnancy tests, you would be able to

A. rebreed pregnant females
B. cull fertile males
C. separate pregnant and non-pregnant females
D. shorten the birthing season

OBJECTIVE 2

Discuss methods of pregnancy testing. Answer the following questions.

1. a. What is the primary method you would use to determine whether a cow is pregnant?

_____

b. How many days after breeding would you use this method?

_____

2. A second method of pregnancy testing cows is analysis of which hormone in the milk?

_____

May be photocopied for student use.

3. What are the three methods for testing ewe pregnancy?

_____

_____

_____

4. a. A sow, Miss Molly, was bred on April 1. When would you perform the ultrasonic pregnancy test?

_____

b. Describe how the ultrasonic pregnancy test is performed on a sow.

_____

_____

_____

5. Describe how the rectal palpation test is performed.

_____

_____

_____

6. You have just completed an ultrasonic pregnancy test on a ewe 45 days after breeding. Rate how comfortable you can feel with the results as high, medium, or low. Why?

_____

_____

7. Describe how the rectal-abdominal palpation is performed.

_____

_____

_____

_____

May be photocopied for student use.

OBJECTIVE 3 **Evaluated on the Assignment Sheet.**

OBJECTIVE 4 **List indications of pregnancy in a rectal examination.** List four indicators.

_____

_____

_____

_____

_____

_____

OBJECTIVE 5 **Evaluated on the Job Sheet.**

OBJECTIVE 6 **Select information about the stages of pregnancy.** Write the letter of the correct answer in the blank.

Part 1 Cattle

____ 1. The legs of the calf fetus are distinguishable at

A. 30-45 days
B. 80-100 days
C. 120-150 days
D. 160-180 days

____ 2. The calf is positioning itself for calving at

A. 210-240 days
B. 250-270 days
C. 280-290 days
D. 300-320 days

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____ 3. The calf fetus is the size of a thumb at

A. 1-30 days
B. 30-45 days
C. 45-60 days
D. 60-75 days

____ 4. The calf is pulled over the pelvic girdle and positioned on the floor of the body cavity at

A. 120-150 days
B. 160-180 days
C. 210-240 days
D. 250-270 days

____ 5. The calf fetus is positioned on the pelvic floor. The uterine horn is usually the size of a boxing glove at

A. 1-30 days
B. 30-45 days
C. 80-100 days
D. 100-120 days

____ 6. There is less fluid in the uterine horn. The uterine horn membrane also seems to be thicker at

A. 100-120 days
B. 120-150 days
C. 160-180 days
D. 180-200 days

____ 7. The estimated length of a six-month old bovine fetus is

A. 12 inches
B. 14 inches
C. 16 inches
D. 18 inches

____ 8. The mass of a calf fetus at 150 days is

A. 1.0 kg
B. 1.8 kg
C. 2.3 kg
D. 3.8 kg

May be photocopied for student use.

____ 9. The mass of a bovine fetus at 270 days is

A. 36.3 kg
B. 48.8 kg
C. 52.7 kg
D. 58.4 kg

Part 2 Sheep

____ 1. The mass of a sheep fetus at 145 days is

A. 2.6 kg
B. 3.8 kg
C. 4.5 kg
D. 5.2 kg

____ 2. The gestation age of a 0.1 kg sheep fetus is

A. 60 days
B. 78 days
C. 90 days
D. 112 days

____ 3. The gestation age of a 1.0 kg sheep fetus is

A. 80 days
B. 90 days
C. 100 days
D. 112 days

Part 3 Swine

____ 1. The mass of a newborn pig is

A. 0.01 kg
B. 0.06 kg
C. 1.13 kg
D. 2.5 kg

____ 2. The gestation age of a 0.80 kg swine fetus is

A. 42 days
B. 56 days
C. 84 days
D. 97 days

May be photocopied for student use.

____ 3. The mass of a swine fetus at 51 days is

A. 0.02 kg
B. 0.06 kg
C. 0.1 kg
D. 1.1 kg

OBJECTIVE 7

Discuss fertility testing in males. Answer the following questions.

1. What are four of the six primary causes of sterility and delayed breeding?

_____

_____

_____

_____

2. a. Describe the physical characteristics of satisfactory semen.

_____

_____

b. What is the male's ability to settle females?

_____

3. a. Describe the physical characteristics of unsatisfactory semen.

_____

_____

b. What is the male's ability to settle females?

_____

May be photocopied for student use.

4. When are the two times that semen should be checked and why?

_____

_____

_____

5. What are the three primary methods of collecting semen?

_____

_____

_____

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LAP SHEET

BIRTH ASSISTANCE B-5

Check the blank as you complete each step.

1. Take	___ the pretest provided by your instructor. Have your instructor evaluate your completed test. After your test has been evaluated, follow your instructor's recommendations.
2. Read	___ the introduction, unit objective, and specific objectives.
3. Do	___ the focus assignments.
4. Stop	___ and have your instructor evaluate your work from the focus assignment. After your work has been evaluated, follow your instructor's recommendations.
5. Study	___ objective 1.
6. Discuss	___ the normal birth process with your instructor.
Optional: Watch	___ videos on parturition in cattle, sheep, and swine.
Optional: Take	___ notes from the video to add to the information for this objective.
7. Study	___ the Information Sheet, objective 2.
Optional: Share	___ your experiences with the birthing of pets or other animals you have observed with the class.
Optional: Talk	___ with a rancher and/or a vet about the various stages of parturition and the types of assistance that might be required.
8. Study	___ objective 3.
9. Ask	___ your instructor to share personal experiences with dystocia.

May be photocopied for student use.

10. **Ask** ___ your instructor to discuss the similarities and differences in dystocia with calves, lambs, and pigs with you.

Optional:
Watch ___ a video on dystocia.

11. **Study** ___ the Information Sheet, objective 4.

12. **Ask** ___ your instructor to show you the chemicals and drugs used in birth assistance and to demonstrate their use.

13. **Ask** ___ your instructor to discuss safety in using these chemicals with you.

14. **Ask** ___ your instructor to teach you or review with you how to give injections from Unit C-3, "Vaccination and Drugs", Job Sheets 5, 6, and 7.

15. **Ask** ___ your instructor to demonstrate how to use chemicals and administer drugs.

Optional:
Review ___ the video that shows the types of chemicals used and how to use them.

Optional:
Practice ___ giving injections on an orange.

16. **Scan** ___ the Information Sheet, objective 5.

17. **Ask** ___ your instructor to show you the basic instruments needed to assist with calving difficulties and demonstrate their use.

18. **Ask** ___ your instructor to discuss each piece of equipment and how it's used.

19. **Study** ___ the Information Sheet, objective 6.

20. **Ask** ___ your instructor to demonstrate and allow you to perform a vaginal examination on a cow, ewe, and/or sow.

Optional:
Review ___ the video that demonstrates and discusses how to perform the procedure.

May be photocopied for student use.

21.	**Study**	___ the Information Sheet, objective 7.
22.	**Ask**	___ your instructor to show you Transparencies 1-9.
	Optional: Review	___ the video that shows the types of malpresentation and discusses how to assist or when to call the vet.
	Optional: Talk	___ with an experienced stock manager and/or a veterinarian about assistance for these conditions and others, such as twins.
23.	**Ask**	___ your instructor to demonstrate the guidelines and procedures in Job Sheet 1. Use the Job Sheet to follow along. Pay careful attention to any guidelines, cautions, and warnings.
24.	**Practice**	___ the procedures demonstrated by your instructor. Use the Job Sheet as a guide. Notify your instructor when you are ready to perform the procedures for evaluation.
25.	**Stop**	___ and have your instructor evaluate your work from the Job Sheet. After your work has been evaluated, follow your instructor's recommendations.
26.	**Ask**	___ your instructor to demonstrate the guidelines and procedures in Job Sheet 2. Use the Job Sheet to follow along. Pay careful attention to any guidelines, cautions, and warnings.
27.	**Practice**	___ the procedures demonstrated by your instructor. Use the Job Sheet as a guide. Notify your instructor when you are ready to perform the procedures for evaluation.
28.	**Stop**	___ and have your instructor evaluate your work from the Job Sheet. After your work has been evaluated, follow your instructor's recommendations.
29.	**Study**	___ the Information Sheet, objective 10.
	Optional: Refer	___ to gestation information in Unit B-1.
30.	**Study**	___ the Information Sheet, objective 11.

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Optional: Watch	___	a video on farrowing and cleaning the piglet.
31. Ask	___	your instructor to demonstrate the guidelines and procedures in Job Sheet 3. Use the Job Sheet to follow along. Pay careful attention to any guidelines, cautions, and warnings.
32. Practice	___	the procedures demonstrated by your instructor. Use the Job Sheet as a guide. Notify your instructor when you are ready to perform the procedures for evaluation.
33. Stop	___	and have your instructor evaluate your work from the Job Sheet. After your work has been evaluated, follow your instructor's recommendations.
34. Study	___	the Information Sheet, objective 13.
35. Ask	___	your instructor to discuss similarities and differences in the care of each species with you.
Optional: Ask	___	your instructor to demonstrate how to stimulate breathing, clear away mucous and membranes, and resuscitate an animal.
Optional: Review	___	the videos that discusses the importance of getting colostrum into the newborn as soon as possible and caring for newborn piglets and lambs.
Optional: Read	___	"Swine Farrowing Units" and "Swine Nursery Units" from the *Pork Industry Handbook* or OSU Fact Sheet, "Environmentally Controlled Farrowing and Nursery Housing".
Optional: Respond	___	to your reading through discussion, writing a short essay, or speaking to the class.
Optional: Design	___	a farrowing unit for a contest. Discuss details with your instructor.

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Optional: Read

___ sections of *Sheep Health and Management* selected by your instructor.

Optional: Respond

___ to your reading through discussion, writing a short essay, or speaking to the class.

36. Ask

___ your instructor to demonstrate the guidelines and procedures in Job Sheet 4. Use the Job Sheet to follow along. Pay careful attention to any guidelines, cautions, and warnings.

37. Practice

___ the procedures demonstrated by your instructor. Use the Job Sheet as a guide. Notify your instructor when you are ready to perform the procedures for evaluation.

38. Stop

___ and have your instructor evaluate your work from the Job Sheet. After your work has been evaluated, follow your instructor's recommendations.

39. Take

___ the posttest provided by your instructor. Have your instructor evaluate your completed test. After your test has been evaluated, follow your instructor's recommendations.

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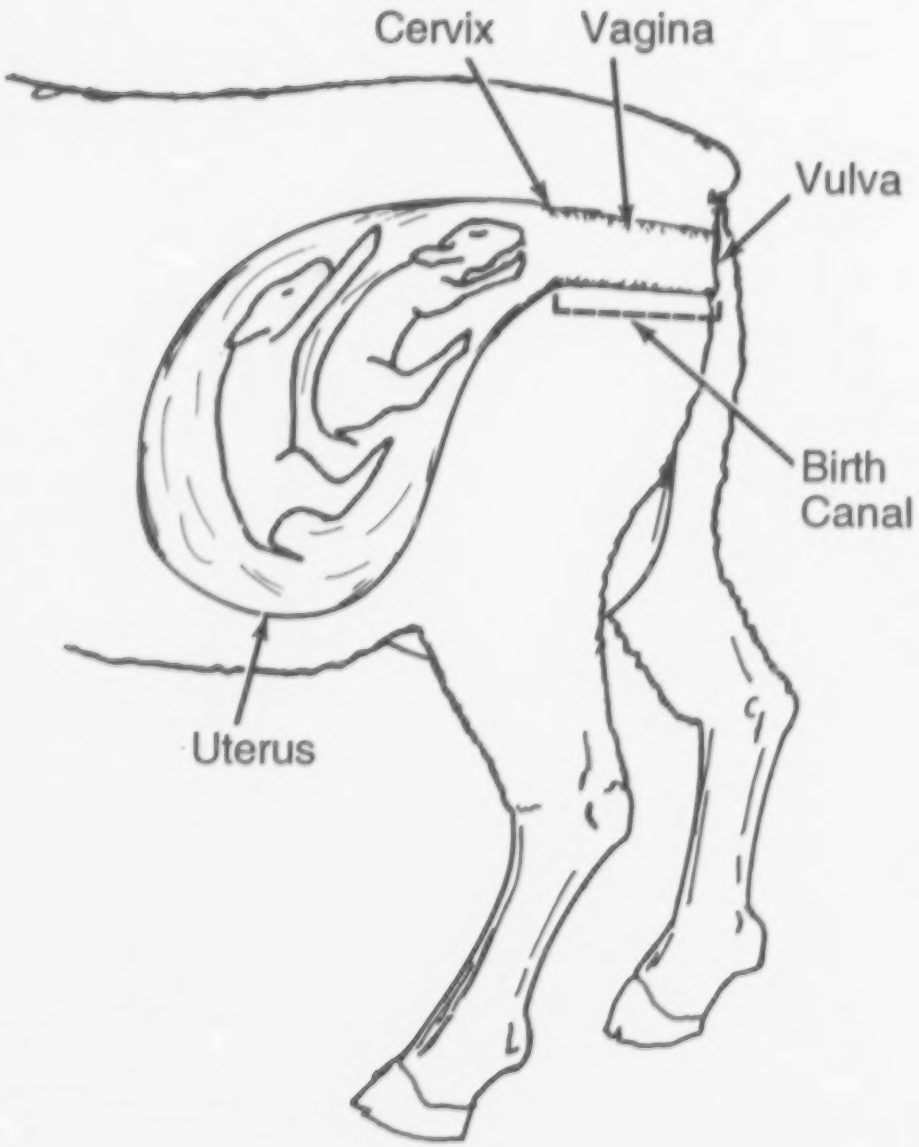
Reproductive Tract and Normal Fetal Position



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Anterior Position

May be photocopied for student use.

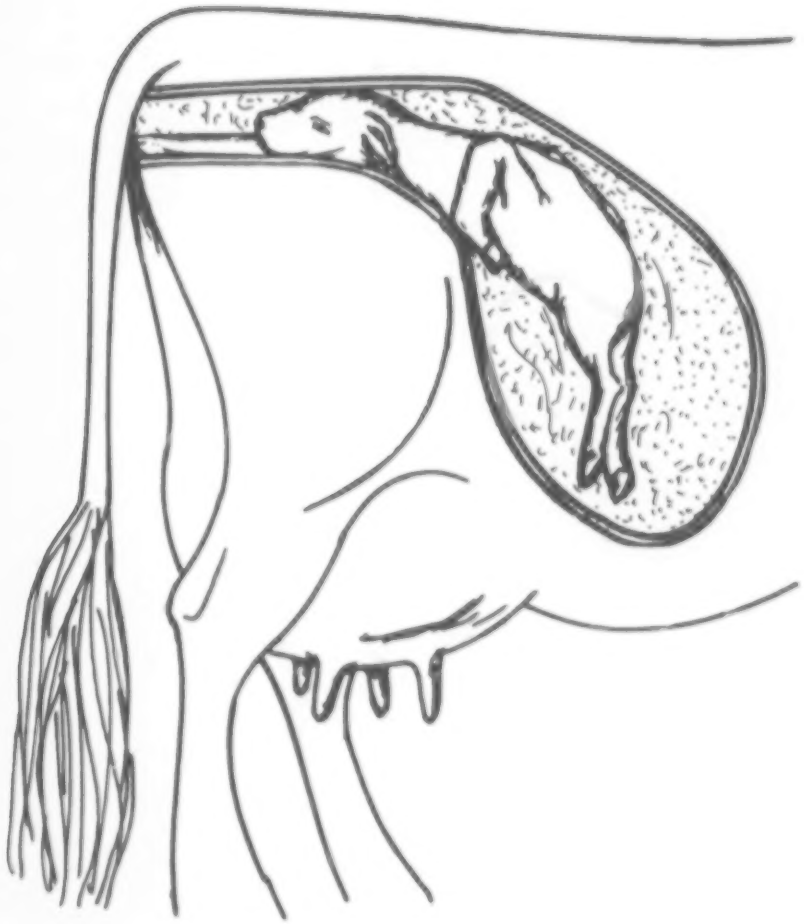
Posterior Position

May be photocopied for student use.

Head Back Position

May be photocopied for student use.

Leg Back Position



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Dog-Sitting Position

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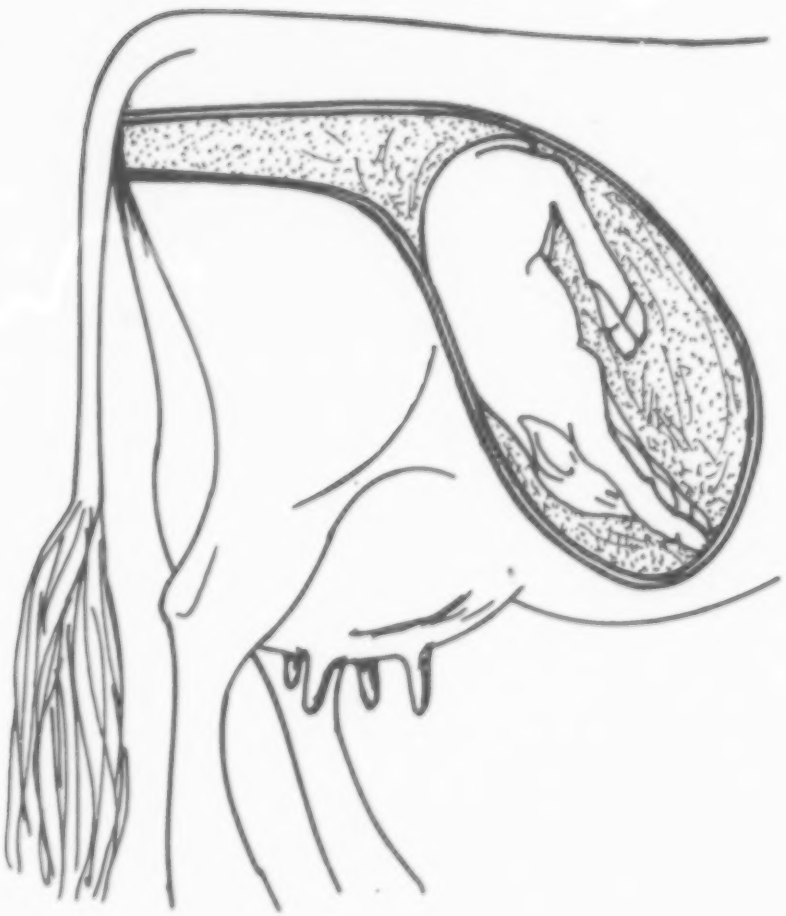
Upside Down and Backward Position



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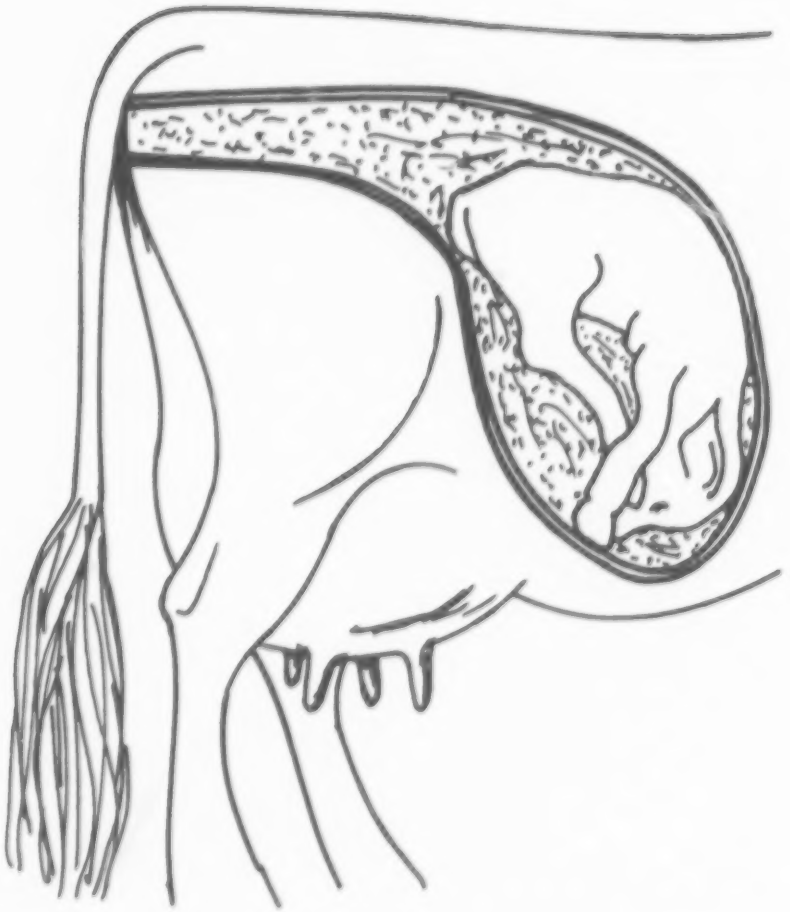
Breech Position



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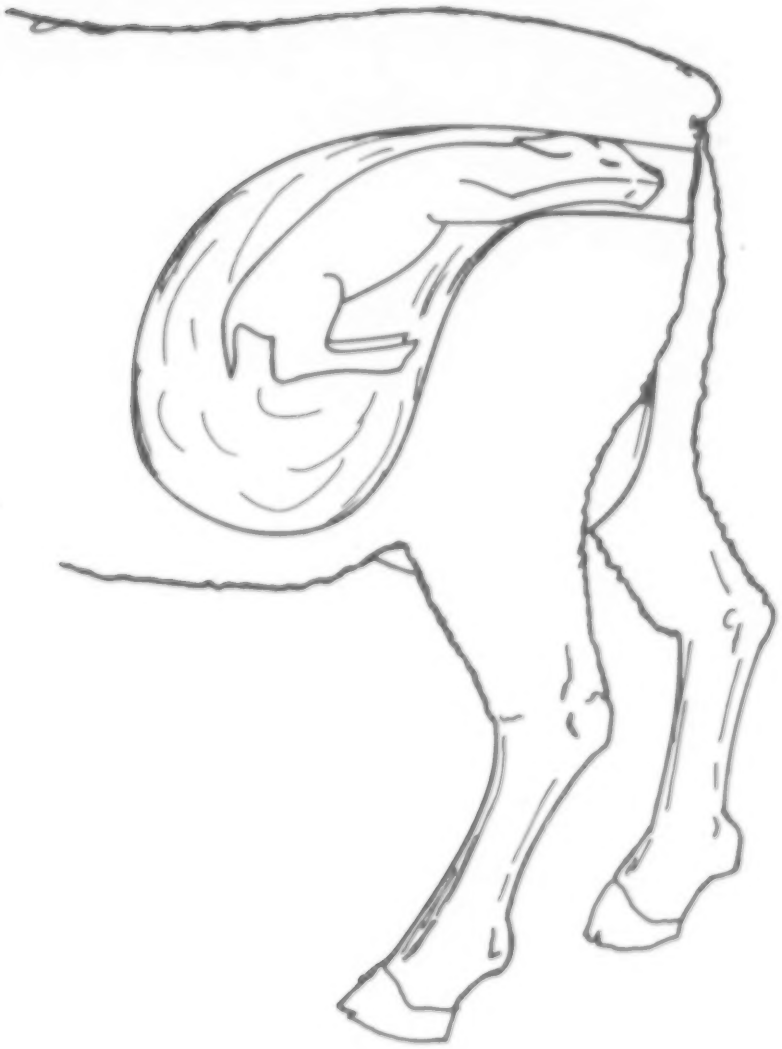
Elbow Lock Position



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WRITTEN TEST

BIRTH ASSISTANCE B-5

Name _____ Score _____

OBJECTIVE 1

Choose the word or phrase to complete statements about parturition and birth assistance. Write the letter of the correct answer in the blank.

____ 1. The variables determining labor are the season of the year, genetic characteristics of the sire and dam, and

A. whether this is the third calf or more
B. whether parturition is in the morning or evening
C. the age of the mother
D. type of feed the dam is fed prior to parturition

____ 2. The hormone that starts the chemical chain to uterine contractions is

A. cortisol from the mother
B. cortisol from the fetus
C. prostaglandin from the mother
D. prostaglandin from the fetus

____ 3. The two hormones that directly stimulate hard uterine contractions are

A. estrogen and progesterone
B. prostaglandin and progesterone
C. progesterone and oxytocin
D. prostaglandin and oxytocin

____ 4. Stage I of parturition begins with

A. dilation of the cervix
B. dilation of the uterus
C. making the bag
D. appearance of the water bag at the lips of the vulva

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____ 5. Stage II of parturition is

A. dilation of the cervix
B. making the bag
C. delivery of the offspring
D. shedding of membranes

____ 6. Stage III of parturition is

A. appearance of the water bag
B. making the bag
C. delivery of the offspring
D. shedding of the membranes

____ 7. Heifers take longer in parturition because their tissues must expand and

A. they don't know what to do
B. their pelvic area is smaller
C. the cervix is tighter during Stage I
D. their tissues are not as strong as a cow's

____ 8. The time at which you should assist with the birth is

A. heifer ½-1 hr; cow 1½-2 hrs
B. heifer 2 hrs; cow 1½ hrs
C. heifer 1-1½ hrs; cow ½-1 hr
D. heifer 1½-2 hrs; cow 1-2 hrs

____ 9. Acidosis is the result of

A. too long in the birth canal
B. too little oxygen and too much carbon dioxide
C. too little oxygen and too much nitrogen
D. too much stress during the birth process

____ 10. In newborn calves, slight acidosis is

A. rare
B. normal
C. cause for concern
D. dangerous

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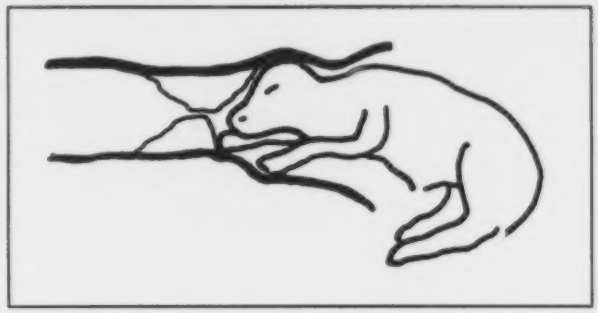
____ 11. The stage of parturition indicated by the illustration is

A. Stage I
B. Stage II
C. Stage III
D. none



____ 12. When they are first born, calves have a heart rate of 100 and a rapid rate of respiration in order to

A. get their lungs working
B. force them to move
C. distribute fresh oxygen to all tissues
D. distribute blood through their system

____ 13. Fetal injury is related to

A. time and pressure
B. pressure and force
C. poor assistance
D. mother's health

____ 14. When a cow has retained the placenta for 48 hours after delivery, you should call the vet

A. after three days
B. if the cow has a fever or doesn't eat
C. to remove the placenta
D. to administer a prescription antibiotic

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____ 15. A normal, healthy calf begins to nurse within

A. 15 minutes after delivery
B. 30 minutes after delivery
C. 45 minutes after delivery
D. 1 hour after delivery

____ 16. The calf has to nurse soon after birth to get colostrum or

A. it won't get antibodies
B. the milk will dry up
C. the cow will reject it
D. its sucking response won't develop

____ 17. The most important factor in delivering a normal, healthy calf is

A. whether the dam is a cow or heifer
B. plenty of colostrum
C. easy contractions
D. quick delivery

____ 18. Shortly after delivery, a normal calf will do all of the following EXCEPT

A. shiver to keep warm
B. shake its head and normalize its breathing
C. urinate and defecate
D. look up and get around

____ 19. During delivery, blood flows to the fetus

A. every 30 seconds
B. with every contraction
C. during relaxation
D. throughout the contraction-relaxation cycle

____ 20. Weak calves are the result of

A. prolonged parturition and low colostrum
B. slow heartbeat and low respiration
C. contractions that are too hard
D. deformities

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OBJECTIVE 2

Match the stages of parturition to their characteristics, dams, and types of assistance. Write the letter of the answer in the blank.

A. Stage I	C. Stage III	E. ewes	G. cows and ewes
B. Stage II	D. cows	F. sows	H. all dams

____ 1. Dams with Stage I duration of more than 1 day

____ 2. Dams for which duration of labor is 30 minutes - 10 hours

____ 3. Stage associated with relaxation of the pelvis

____ 4. Stage in which ewes have a suppressed appetite

____ 5. Dams that can take two weeks or longer for the completion of Stage III

____ 6. Dams you would palpate for normal position, presentation, and posture in the event of dystocia

____ 7. Stage in which increased mucous discharge is normal

____ 8. Dams for which duration of labor is 30-45 minutes

____ 9. Dams for which a hollow area appears in front of the hips at the end of Stage I

____ 10. Dams that need veterinary assistance if they haven't delivered two hours after the water sac breaks

____ 11. Stage in which you should observe for a reddish discharge that increases in volume, has a foul smell, and/or contains pus

____ 12. Stage that is MOST LIKELY to require assistance

____ 13. Dams that make a nest before delivery

____ 14. Dams that should receive antibiotics if the placenta is retained

____ 15. Stage in which the water sac breaks

____ 16. Dams for which you palpate the fetus for normal position

____ 17. Dams for which you inject oxytocin

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____ 18. Dams for which you pull the offspring out with a snare, pulling only as hard as one hand can pull

____ 19. Dams for which you should call the vet if the placenta is retained for 12 hours

____ 20. Dams for which mild, short straining is common during stage III.

OBJECTIVE 3

Discuss dystocia.

You will create an imaginary birth assistance situation and discuss how you would handle it. For example, you have a cow or a ewe with dystocia. You must decide whether you're raising cattle or sheep and what is causing the problem. Describe what will happen to the fetus and dam if the problem isn't resolved successfully. You then determine what should be done for this specific situation.

Type of animal _____

First calf? yes ___ no ___

Cause of the dystocia _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

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OBJECTIVE 4

Discuss chemicals and drugs needed to assist with the birthing process. Answer the following questions.

1. What type of soap is used as obstetrical soap?

2. What is obstetrical soap used for?

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3. What can you use as a substitute if you don't have obstetrical soap?

_____

4. Why do you use a lubricant?

_____

_____

_____

_____

5. If you are expecting to assist with farrowing at the end of the week, what GENERAL type of antibiotic would you request from your supplier?

_____

6. What do you use antiseptic for during the birth process?

_____

7. What would a disinfectant be used for?

_____

8. (a) What is the drug that stimulates uterine contractions?

_____

(b) It's now 11:50 am. If the first pig was delivered 20 minutes ago at 11:30 am, when should you administer the drug?

_____

(c) If the sow is average size, what dosage should you use?

_____

(d) If there are no results from the first injection, what is the *earliest* time (am or pm) that you could give the second injection?

_____

May be photocopied for student use.

OBJECTIVE 5

Identify basic instruments needed to assist with calving difficulties. Your instructor will show you examples of three different instruments. Write the name of the instrument in the blank.

1. _____

2. _____

3. _____

OBJECTIVE 6

Describe how to perform a vaginal examination by hand. Write a description of the procedure, including preparation and the four factors to check.

_____

_____

_____

_____

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May be photocopied for student use.

OBJECTIVE 7

Select actions to take for various calving and lambing positions. Write the letter of the correct answer in the blank.

____ 1. For a calf in the dog-sitting position, you would

A. call a vet
B. push the rear legs back, grasp the front legs, and pull
C. use an obstetrical chain around the poll, under the ears, and through the mouth
D. alternate pushing the rear legs down and pulling the front legs forward

____ 2. In assisting a birth with the head back, you must guard against

A. infection
B. the cord separating and causing drowning
C. the neck snapping
D. the open jaws cutting the birth canal

____ 3. For a calf in a breech position, the BEST ACTION would be to

A. call a vet
B. place the obstetrical chains on both legs
C. place the obstetrical chain on one rear leg at a time
D. push the calf forward, grasp the leg and pull

____ 4. When the calf has a leg back, you should

A. call a vet
B. push the calf or lamb back by the head and hold the folded foot in your hand
C. use an obstetrical chain around the straight leg
D. use an obstetrical chain around the folded leg

____ 5. If a lamb has its head back, you must pull the head and neck around in line with the birth canal. The BEST ACTION would be to

A. call a vet
B. push the lamb back and pull the head forward into the birth canal
C. push the lamb back and quickly release it in order to grasp its nose with your hand
D. place a chain around the ears and through the mouth and pull

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____ 6. Normal birth position requires

A. no action
B. no action unless there is a delay in delivery
C. no action unless the dam is straining
D. palpation if birth has not occurred in 30 minutes after onset of labor

____ 7. If the lamb is upside down and backward, you would

A. call a vet
B. use an obstetrical chain around the rear legs
C. rotate the lamb into posterior presentation position
D. rotate the lamb into anterior presentation position

____ 8. To release an elbow lock, you should

A. pull both legs forward over the pelvic rim
B. alternate pulling each leg until they release
C. push the head back, pull one leg forward
D. push the head back, push one leg back, pull one leg forward

OBJECTIVE 8

Evaluated on Job Sheet 1.

OBJECTIVE 9

Evaluated on Job Sheet 2.

OBJECTIVE 10

Select normal birth averages for swine. Write the letter of the correct answer in the blank.

____ 1. Gestation ranges from

A. 100-110 days
B. 110-112 days
C. 112-117 days
D. 115-122 days

____ 2. The last pig from each uterine horn has a viability ratio of

A. 10%
B. 25%
C. 50%
D. 70%

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____ 3. The average number of pigs in a litter is

A. 7-8
B. 8-9
C. 9-10
D. 10-12

____ 4. Approximately what percent of pigs have posterior presentation or are born breech?

A. 18-20%
B. 24-25%
C. 30-33%
D. 50-70%

____ 5. Litter size can range from

A. 1-20
B. 5-10
C. 1-15
D. 5-25

____ 6. The average number of days in the gestation period is

A. 111
B. 114
C. 116
D. 117

OBJECTIVE 11

Discuss farrowing difficulties and the appropriate assistance. Write your answers in the blanks.

1. If you had a distressed sow, you would probably consult with the vet. What could you do to improve her condition?

_____

_____

_____

2. What do you do for a sow with hysteria?

_____

_____

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3. a. What is the pig's position in a transverse presentation?

_____

b. What would you do if you had a pig in a transverse presentation?

_____

_____

4. What would indicate that one or all of the pigs may be dead?

_____

5. Your best sow, Miss Molly, has not delivered by the 118th day. She doesn't seem to be in distress. What is your plan of action?

_____

_____

6. Name two situations in which you would call the vet immediately.

_____

_____

7. a. What is the condition in which the womb has not contracted fully?

_____

b. What do you do for a sow with this condition?

_____

OBJECTIVE 12 **Evaluated on Job Sheet 3.**

OBJECTIVE 13 **Discuss care of the newborn calf, lamb, and piglet.**

1. Why is it important for the newborn to have a rapid respiratory rate?

_____

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2. Why is it important for the newborn to nurse within a few hours after birth?

_____

3. What disinfectant do you use to clean the navel area?

_____

4. Within a few days of birth, you should complete several procedures on piglets. What are they?

_____

_____

_____

_____

5. You have a ewe that has dystocia. You've waited too long to assist in the birth. By the time you get the lamb delivered, the ewe is exhausted. When the lamb comes out, its nose and mouth are full of mucous. It's evident that the lamb has a moderate amount of acidosis. When you finally get him breathing, you try to get him to nurse, but the ewe rejects him.

   Describe what you do to take care of the lamb. Describe the first steps you take. Include how you remove the mucous, what you do to correct the acidosis, what you do to try and get him to nurse. When he can't nurse and the ewe rejects him, what is your next move? Describe two ways that you will attempt to make the ewe accept her lamb.

_____

_____

_____

_____

_____

_____

_____

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OBJECTIVE 14

Evaluated on Job Sheet 4.

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Farrowing

Good management at farrowing time can mean a higher survival rate for your piglets. About 50% of piglet deaths before weaning occur in the first two days after farrowing. Birth assistance can lead to one additional piglet per litter. The keys to good management are to be observant, practice good sanitation, have the proper equipment, provide assistance at the proper time, and call a vet when needed and in time.

Parturition is a chain of hormonal events. It starts with hormones released by the fetus. The fetal brain produces a peptide hormone which stimulates production of ACTH (adrenocorticotrophic hormone) in the anterior pituitary gland. The ACTH tells the adrenal gland to secrete cortisol. The cortisol passes through the umbilical cord and into the sow's placenta. It signals the placenta and uterus to produce prostaglandin. The prostaglandin tells the ovaries that it is time to stop making progesterone, which leaves estrogen as the primary hormone affecting the uterus. The cortisol also signals the ovaries to produce relaxin and signals the sow's posterior pituitary gland to secrete oxytocin.

The relaxin starts dilation of the cervix about two days before farrowing. The sow may become nervous, her teats fill, and she may build nests. Her body temperature will rise a degree or two about half a day before farrowing.

The oxytocin stimulates contractions of the uterus, beginning about four to nine hours before the first piglet is born. The average delivery usually begins in the late afternoon or at night. Piglets are delivered at approximately 15 minute intervals and the entire process may be completed in two to five hours. (This is *average*, but every animal is different; with time you will learn your sows' individual patterns.)

Parturition can't be accurately predicted, so inducing labor is one way to be sure you are there to assist and to increase the number of live piglets. Before you can induce labor, you should know the exact breeding date and the average length of gestation for the breed or for the particular sow. Accurate record keeping is very important if you want maximum survival of your piglets and maximum profit from your herd.

To induce labor, you give the sow an intramuscular injection of prostaglandin or a similar compound.

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Sows should not be induced earlier than three days before they are due. Inducing labor too early results in piglets that weigh less and have a reduced chance of survival.

In the event of dystocia during farrowing, you can be there to stimulate uterine contractions, help deliver piglets that are having difficulty, or to call a vet if you can't identify the problem or it's too difficult for your current level of experience and ability.

Induced farrowing enables you to time the delivery so you can be available to assist. Farrowing facilities and work force can be used more efficiently. Piglets and litters can be given foster care by nursing sows, if needed.

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LAP SHEET

BIOTECHNOLOGY: EMBRYO TRANSFER AND GENE SPLICING

B-6

Check the blank as you complete each step.

1. **Take** ___ the pretest provided by your instructor. Have your instructor evaluate your completed test. After your test has been evaluated, follow your instructor's recommendations.

2. **Read** ___ the introduction, unit objective, and specific objectives.

3. **Do** ___ the focus assignments.

4. **Stop** ___ and have your instructor evaluate your work from the focus assignment. After your work has been evaluated, follow your instructor's recommendations.

5. **Study** ___ the Information Sheet, objective 1.

Optional: Read ___ the pamphlets *Biotechnology at Work: Animals, People and Biotechnology* and *Biotechnology at Work: Glossary of Terms.*

Optional: Watch ___ the video *Connections: Animals, People and Biotechnology.*

Optional: Write ___ a short paper on the history of biotechnology.

6. **Study** ___ the Information Sheet, objective 2. Think about your own opinions and feelings about genetic engineering.

Optional: Find ___ current magazine and newspaper articles dealing with the moral and ethical issues regarding genetic engineering. Share your findings with the class.

Optional: Read ___ about the legal aspects of biotechnology. The publications *Answers to Commonly Asked Questions About Biotechnology Regulation* and *Year-End Survey of State Government Legislation on Biotechnology* are two possible sources of information.

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7. **Study**	___	the Information Sheet, objectives 3 and 4.
Optional: Read	___	OSU Fact Sheet No. 3158 *Embryo Transfer in Cattle.*
Optional: Interview	___	an embryo transfer technician about embryo transfer.
8. **Study**	___	the Information Sheet, objectives 5 and 6.
Optional: Research	___	specific examples of gene splicing.
9. **Study**	___	the Information Sheet, objective 7.
10. **Study**	___	the Information Sheet, objective 8.
Optional: Find	___	specific examples of software programs or computer applications for animal science.
Optional: Write	___	a short paper on the importance of computers in the animal science field.
11. **Do**	___	Assignment Sheet 1.
12. **Stop**	___	and have your instructor evaluate your work from the Assignment Sheet. After your work has been evaluated, follow your instructor's recommendations.
13. **Do**	___	Assignment Sheet 2.
14. **Stop**	___	and have your instructor evaluate your work from the Assignment Sheet. After your work has been evaluated, follow your instructor's recommendations.
15. **Take**	___	the posttest provided by your instructor. Have your instructor evaluate your completed test. After your test has been evaluated, follow your instructor's recommendations.

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WRITTEN TEST

BIOTECHNOLOGY: EMBRYO TRANSFER AND GENE SPLICING

B-6

Name _____ Score _____

OBJECTIVE 1

Choose the word or phrase to complete statements about genetic engineering. Write the letter of the correct answer in the blank.

____ 1. Genetic engineering involves or may be referred to as gene cloning, gene transfer, recombinant DNA, or

A. experimentation
B. gene splicing
C. hormone replacement
D. gene therapy

____ 2. One purpose of genetic engineering is to increase the production of fiber, egg, meat, or

A. enzymes
B. services
C. milk
D. money

____ 3. One purpose of genetic engineering is to make improvements in animal food products in quality and

A. composition
B. desirability
C. price
D. quantity

____ 4. The era of genetic engineering began in

A. 1984
B. 1977
C. 1990
D. 1967

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____ 5. Purposes of genetic engineering include the ability to improve human health, produce new products through genetic alteration of animals, decrease animal use, and

A. reduce employees needed
B. prevent surpluses of products
C. reduce available products
D. prevent and control animal disease

OBJECTIVE 2

Discuss moral and ethical issues associated with genetic engineering. Write your answers in the blanks.

1. Who benefits from genetic engineering?

_____

_____

_____

2. What are four concerns about the use of genetic engineering?

_____

_____

_____

_____

3. Name five ethical questions regarding genetic engineering.

_____

_____

_____

_____

_____

_____

_____

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OBJECTIVE 3

Discuss embryo transfer. Write your answers in the blanks.

1. What are the benefits of embryo transfer?

2. What are the recent advancements or current research in embryo transfer?

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OBJECTIVE 4

Describe the transfer process. Write your answers in the blanks.

1. Selection of the donor cow – _____

_____

_____

2. Superovulation of the donor cow – _____

_____

_____

3. Insemination of the donor cow – _____

_____

_____

4. Flushing of the embryos – _____

_____

_____

5. Evaluation of the embryos – _____

_____

_____

6. Selection and preparation of the recipient cow – _____

_____

_____

7. Transfer of the embryo – _____

_____

_____

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OBJECTIVE 5

Discuss gene mapping and gene splicing. Write your answers in the blanks.

1. To modify the gene code what must be known?

   _____

2. What is used to splice a gene out of a chromosome?

   _____

3. Briefly discuss the step of transferring the piece of excised DNA to a vector.

   _____

   _____

   _____

   _____

4. What must appear in the target organism?

   _____

5. What must you do after the steps in gene splicing are completed?

   _____

   _____

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OBJECTIVE 6

Select situations in which gene splicing can be used. Write an "X" in the blank before each correct answer.

____ 1. To prevent and control animal disease

____ 2. To produce animal models for use in research

____ 3. To decrease quality of meat, milk, eggs, or fiber

____ 4. To produce therapeutic agents for human use

____ 5. To reduce the probability of surplus commodities

____ 6. To produce more meat, milk, eggs, or fiber

____ 7. To produce communications techniques

____ 8. To produce higher quality meat, milk, eggs, or fiber

OBJECTIVE 7

Discuss cloning technology. Write your answers in the blanks.

1. How is plant cloning accomplished?

_____

_____

_____

_____

2. Cloning of mammals involves what procedure?

_____

3. What is one form of cloning mammals?

_____

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OBJECTIVE 8

Choose the word or phrase to complete statements about computer applications in animal science. Write your answers in the blanks.

____ 1. Computer networks allow individuals access to market prices and information, electronic mail, and

A. employee records
B. price predictions
C. educational information
D. personal data

____ 2. Research applications include record keeping of research projects, computer simulation, and

A. statistical interpretation of research data
B. employee management
C. graphics design
D. paper reduction

____ 3. Record keeping and decision making can be made easier by software programs for financial accounting systems, for determining when products should be sold, aiding in management inventory, and

A. aiding in weather forecasts
B. aiding in preventing employee theft
C. determining feed preferences of animals
D. aiding in tax management

____ 4. Computerized record keeping systems for livestock management include health and/or production records, breeding records and parturition records, management of crops, machinery uses, and

A. employee education
B. balancing rations for livestock
C. prevention of injuries
D. balancing rations for people

____ 5. Computer applications in animal science include business management and marketing applications, record keeping and decision making, research applications, and

A. entertainment
B. graphic design
C. production management applications
D. time management applications

May be photocopied for student use.

OBJECTIVE 9	**Evaluated on Assignment Sheet 1.**
OBJECTIVE 10	**Evaluated on Assignment Sheet 2.**

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Designer Mice, Increased Milk, Identical Herds: What is Going On Here?

In recent years, developments in biotechnology have made what once seemed like science fiction a reality. Genetic engineering of animals has three major categories: production of animal disease models for use in medical research, the production of therapeutic agents for humans, and the production of improved or increased animal products. Genetic engineering of animals has opened a realm of scientific opportunities as well as concerns about human and animal welfare and fears about abuses of the technology.

Genetic engineering is used in medical research and for the production of health products for animals and humans. The first "designer mouse" had a human cancer gene inserted so that it would be a more accurate model of human cancer. Harvard university was granted a U.S. patent in 1988 for this transgenic mouse and in 1991 was granted a European patent. Sheep have been genetically engineered to produce Factor IX in their milk, which is a human-blood clotting factor. Research is currently being conducted on the use of genetically-engineered products to prevent shipping fever in cattle.

Genetic engineering can be used to increase or improve the production of agricultural products. Genetic engineering is used in plant science to improve crop production. In animal science, bovine somatotropin (BST), a growth hormone protein, to increase the milk yields of dairy cattle is a controversial technology that is already being used in some dairy operations. Porcine somatotropin (PST) has been used in hogs to produce leaner cuts of pork.

Cloning has long been a scientific fantasy but with recent developments in genetic engineering, is not as far-fetched as it once seemed. Plants can be cloned using new technologies in genetic engineering. Mammals can, in effect, be "cloned" through the procedure of embryo splitting, where two or more identical calves can be produced.

The question to society is "What and how will genetic engineering be used?" no longer "Will genetic engineering be used?" Biotechnology can benefit humans and also animals but may also pose certain dangers. What is or is not appropriate use of biotechnology is a decision that society as a whole must grapple with. Biotechnology is regulated by a variety of federal agencies as well as state laws.

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LAP SHEET

ANIMAL HEALTH CARE C-1

Check the blank as you complete each step.

1. Take	___ the pretest provided by your instructor. Have your instructor evaluate your completed test. After your test has been evaluated, follow your instructor's recommendations.
2. Read	___ the introduction, unit objective, and specific objectives.
3. Do	___ the focus assignments.
4. Stop	___ and have your instructor evaluate your work from the focus assignment. After your work has been evaluated, follow your instructor's recommendations.
5. Study	___ the Information Sheet, objective 1.
6. Review	___ Unit A-1, "Safety," objectives 4, 5, 6, 8, 10, and 11.
Optional: Talk	___ with a veterinarian and/or a livestock owner/manager about the health care plan and how vets and managers work together.
Optional: Ask	___ your instructor to share personal examples of successful and unsuccessful health care practices with you.
Optional: Ask	___ your instructor to discuss animal welfare and animal rights with you.
7. Study	___ the Information Sheet, objective 2.
8. Compare	___ signs of healthy and unhealthy animals (objective 3).
Optional: Watch	___ slides or videos of healthy animals.

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Optional: **Talk**	___	with a veterinarian or herd manager about signs of a healthy animal.
9. **Study**	___	the Information Sheet, objective 3.
Optional: **Talk**	___	with a veterinarian or herd manager about signs of an unhealthy animal.
Optional: **Compare**	___	signs of an unhealthy animal to human health and behavior.
Optional: **Watch**	___	slides or videos of unhealthy animals.
10. **Study**	___	the Information Sheet, objective 4.
Optional: **Compare**	___	normal rates and ranges to those of humans and other animals.
Optional: **Discuss**	___	with your instructor the importance of knowing the norms and recognizing any variation from them.
Optional: **Relate**	___	this knowledge to good record keeping.
11. **Ask**	___	your instructor to demonstrate the guidelines and procedures in Job Sheet 1. Use the Job Sheet to follow along. Pay careful attention to any guidelines, cautions, and warnings.
12. **Practice**	___	the procedures demonstrated by your instructor. Use the Job Sheet as a guide.
13. **Stop**	___	and have your instructor evaluate your work from the Job Sheet. After your work has been evaluated, follow your instructor's recommendations.
14. **Ask**	___	your instructor to demonstrate the guidelines and procedures in Job Sheet 2. Use the Job Sheet to follow along. Pay careful attention to any guidelines, cautions, and warnings.
15. **Practice**	___	the procedures demonstrated by your instructor. Use the Job Sheet as a guide.

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16. **Stop** ___ and have your instructor evaluate your work from the Job Sheet. After your work has been evaluated, follow your instructor's recommendations.

Optional: Take ___ the posttest provided by your instructor. Have your instructor evaluate your completed test. After your test has been evaluated, follow your instructor's recommendations.

17. **Study** ___ the Information Sheet, objective 7.

18. **Ask** ___ your instructor to discuss why each of the items listed is important for maintaining animal health.

Optional: Visit ___ facilities and observe herd management practices.

Optional: Research ___ how management practices protect human health, water systems, or other areas of concern.

Optional: Read ___ a related OSU Extension publication and present an oral report to the class.

Optional: Ask ___ your instructor to show you examples of facility designs.

Optional: Ask ___ your instructor to discuss with you the high rate of TGE spread during spring stock shows.

19. **Study** ___ the Information Sheet, objective 8.

20. **Ask** ___ your instructor to discuss how the factors relate to the health plan and other aspects of herd management.

Optional: Ask ___ your instructor to show you examples of written health plans and records.

21. **Do** ___ the Assignment Sheet.

May be photocopied for student use.

22. **Stop**	___	and have your instructor evaluate your work from the Assignment Sheet. After your work has been evaluated, follow your instructor's recommendations.
23. **Study**	___	the Information Sheet, objective 10.
Optional: Experience	___	examples of good and poor ventilation and report your physical and psychological reactions to the class.
Optional: Discuss	___	the relationship between humidity and air movement.
Optional: Examine	___	the ventilation system in your ag facility, in a greenhouse, and in a livestock barn or other structure.
24. **Study**	___	the Information Sheet, objectives 11 and 12 together.
Optional: Ask	___	your instructor to discuss the importance of learning about disinfectants, which disinfectant to use, and how to use it correctly.
Optional: Wash down	___	several clearly developed forms of fungus with several types of disinfectants and observe the results.
Optional: Perform	___	an experiment in which you grow bacteria and test different types of disinfectants.
25. **Ask**	___	your instructor to provide a resource on types of disinfectants, their uses, concentrations, and limitations.
Optional: Ask	___	your instructor to show you several types of disinfectants; discuss their uses, strengths, and limitations; and let you see, smell, and feel those that aren't caustic or toxic.
Optional: Ask	___	your instructor to discuss the caustic and toxic characteristics of some disinfectants with you.
Optional: Watch	___	a video on disinfectants.

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Optional: Take ___ the posttest provided by your instructor. Have your instructor evaluate your completed test. After your test has been evaluated, follow your instructor's recommendations.

26. Study ___ the Information Sheet, objective 13.

Optional: Ask ___ your instructor to provide information on how you can get first-aid training in your area.

Optional: Ask ___ your instructor to discuss the importance of close observation and good record keeping with you.

27. Ask ___ your instructor to demonstrate the guidelines and procedures in Job Sheet 3. Use the Job Sheet to follow along. Pay careful attention to any guidelines, cautions, and warnings.

28. Practice ___ the procedures demonstrated by your instructor. Use the Job Sheet as a guide.

29. Stop ___ and have your instructor evaluate your work from the Job Sheet. After your work has been evaluated, follow your instructor's recommendations.

30. Study ___ the Information Sheet, objective 15.

Optional: Ask ___ your instructor for Handout 2.

Optional: Ask ___ your instructor to provide additional examples of the examine-evaluate process.

Optional: Ask ___ your instructor to discuss the need to improvise in some circumstances.

Optional: Talk ___ with a veterinarian about what you can learn to do and when to call the vet.

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Optional: Visit	___	a veterinary facility where you can observe animals being treated for injuries.
31. Ask	___	your instructor to demonstrate the guidelines and procedures in Job Sheet 4. Use the Job Sheet to follow along. Pay careful attention to any guidelines, cautions, and warnings.
32. Practice	___	the procedures demonstrated by your instructor. Use the Job Sheet as a guide.
33. Stop	___	and have your instructor evaluate your work from the Job Sheet. After your work has been evaluated, follow your instructor's recommendations.
34. Study	___	the Information Sheet, objective 17.
35. Write	___	a short essay relating these requirements to one another, to animal health, and to finances.
Optional: Compare	___	differences in climate and how they affect shelter requirements.
Optional: Research	___	ways herd management has affected space requirements, such as breeding polled cattle or producing free-range chickens.
Optional: Watch	___	a video on facilities.
Optional: Take	___	the posttest provided by your instructor. Have your instructor evaluate your completed test. After your test has been evaluated, follow your instructor's recommendations.
36. Study	___	the Information Sheet, objective 18.
Optional: Ask	___	your instructor to discuss similarities and differences in handling each species.
37. Study	___	the Information Sheet, objective 19.

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Optional: Ask	___	your instructor to discuss how learning restraints and being confident in their use is critical to effective management.
Optional: Ask	___	your instructor to review the uses and purposes of each of the restraints listed.
Optional: Ask	___	your instructor to compare the restraints used for similar purposes but designed for different animals.
Optional: Ask	___	your instructor to demonstrate the use of restraints.
Optional: Watch	___	a video on handling and restraints.
38. Study	___	the Information Sheet, objective 20.
39. Refer to	___	Unit C-1, "Vaccination and Drugs" for information on injections.
Optional: Ask	___	your instructor to discuss and demonstrate how chemical restraints are used.
40. Ask	___	your instructor to demonstrate the guidelines and procedures in Job Sheet 5. Use the Job Sheet to follow along. Pay careful attention to any guidelines, cautions, and warnings.
41. Practice	___	the procedures demonstrated by your instructor. Use the Job Sheet as a guide.
42. Stop	___	and have your instructor evaluate your work from the Job Sheet. After your work has been evaluated, follow your instructor's recommendations.
43. Ask	___	your instructor to demonstrate the guidelines and procedures in Job Sheet 6. Use the Job Sheet to follow along. Pay careful attention to any guidelines, cautions, and warnings.
44. Practice	___	the procedures demonstrated by your instructor. Use the Job Sheet as a guide.

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45. **Stop** ___ and have your instructor evaluate your work from the Job Sheet. After your work has been evaluated, follow your instructor's recommendations.

46. **Ask** ___ your instructor to demonstrate the guidelines and procedures in Job Sheet 7. Use the Job Sheet to follow along. Pay careful attention to any guidelines, cautions, and warnings.

47. **Practice** ___ the procedures demonstrated by your instructor. Use the Job Sheet as a guide.

48. **Stop** ___ and have your instructor evaluate your work from the Job Sheet. After your work has been evaluated, follow your instructor's recommendations.

49. **Take** ___ the posttest provided by your instructor. Have your instructor evaluate your completed test. After your test has been evaluated, follow your instructor's recommendations.

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WRITTEN TEST

ANIMAL HEALTH CARE C-1

Name _____ Score _____

OBJECTIVE 1

Discuss animal health care.

1. What are "hidden losses" due to disease?

_____

_____

_____

2. Many diseases are caused by infectious organisms such as bacteria and viruses. List five other causes of disease.

_____

_____

_____

_____

_____

3. What is meant by "Some of these causes (in question 2) can be associated with human behavior, human decisions, and human error?"

_____

_____

_____

_____

May be photocopied for student use.

4. What are five areas of concern for maintaining high standards for your animals and operation?

5. What is a health plan?

6. Who is responsible for developing a health plan?

7. Name five aspects of production management that are included in a health plan.

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8. Why is it important to keep accurate records for working with your vet?

9. What are the five situations in which you should call a vet?

10. What are the advantages of calling the vet early?

11. You have an animal with severe diarrhea, vomiting, and high temperature. You have called the vet, and she will arrive in about 20 minutes. What should you do to be prepared to assist her?

May be photocopied for student use.

_____

_____

_____

_____

_____

12. Robert doesn't want to ask a vet for assistance and he feels he just can't take the time to make out a health plan, so he has already increased the potential for disease and parasites in his sheep operation. What is the next single MOST important management strategy that he can use to prevent disease in his flock?

_____

OBJECTIVE 2

List signs of a healthy animal. Write eight signs of a healthy animal in the blanks.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____

612

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OBJECTIVE 3

List signs of an unhealthy animal. Write ten signs of an unhealthy animal in the blanks.

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

9. _____

10. _____

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OBJECTIVE 4

Match livestock to their normal ranges of temperature, pulse rate, and breathing rate. Write the correct letters in the blanks.

temperature in degrees Fahrenheit

A.	100.3	C.	102.3	E.	102.6	G.	104.6
B.	101.5	D.	102.5	F.	103.2	H.	106.0

____ 1. cattle

____ 2. sheep

____ 3. swine

____ 4. poultry

pulse in beats per minute

A.	50-60	C.	60-80	E.	120-150	G.	200-400
B.	60-70	D.	70-80	F.	250-270	H.	150-370

____ 1. cattle

____ 2. sheep

____ 3. swine

____ 4. poultry

breathing rate in respirations per minute

A.	8-13	C.	10-30	E.	15-36
B.	10-17	D.	12-20	F.	20-33

____ 1. cattle

____ 2. sheep

____ 3. swine

____ 4. poultry

OBJECTIVE 5

Evaluated on Job Sheet 1.

OBJECTIVE 6

Evaluated on Job Sheet 2.

May be photocopied for student use.

Name _____ Score _____

OBJECTIVE 7

Discuss good management practices for maintaining animal health. Write your answers in the blanks provided. Some practices may be used more than once.

1. You are preparing to purchase fifteen head of cattle. What management practices for animal health can you apply at the time of purchase and as the animals arrive?

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

2. If you house the cattle in a barn, what management practices should you use to promote animal health inside the barn?

_____

_____

May be photocopied for student use.

3. If you house the animals in a field, what management practices should you use?

May be photocopied for student use.

4. If three of the cattle become ill and one dies, what management practices are called for?

5. What is the reason for rotating pastures, rotating species in your pastures, or using pasturage for crops?

May be photocopied for student use.

6. The owners of the land next to yours also raise cattle, but do not use good herd management practices. What can you do to protect your animals?

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

OBJECTIVE 8

Discuss factors to consider when developing a health plan. Write your answers in the blanks provided.

1. What health plan records should be kept?

_____

_____

_____

_____

_____

2. Why is it desirable to develop a closed herd of females?

_____

_____

3. What type of sires should you plan to buy?

_____

May be photocopied for student use.

4. As your health plan is developed, what medical and medicinal procedures should be scheduled?

5. What sanitation procedures should be part of your health plan?

OBJECTIVE 9

Evaluated on Assignment Sheet 1.

May be photocopied for student use.

OBJECTIVE 10

Select true statements about ventilation. Write an "X" in the blank before each true statement.

____ 1. A good ventilation system must provide enough recycled air to meet the respiratory needs of the livestock.

____ 2. Animals kept in a poorly ventilated space become stressed and less resistant to disease.

____ 3. Low concentration of oxygen in an area with poor air circulation and replacement can lead to bad tempers.

____ 4. Good ventilation prevents the buildup of unpleasant gases from decomposing urine and other sources, which can irritate mucous membranes.

____ 5. Excess humidity is caused by air that is too cold or too hot.

____ 6. Low humidity levels will encourage the growth of pathogens and the transmission of contagious diseases.

____ 7. Ventilation is directly related to the amount of humidity in your facility.

____ 8. Good ventilation prevents the buildup of excess moisture in the air.

____ 9. High humidity levels improve immunity.

____ 10. Poorly ventilated facilities have a high concentration of stale air and moisture.

____ 11. Whether your building is concrete or wood is a determining factor in the type of ventilation system you should install.

____ 12. The system must move enough air to eliminate disease organisms from the facility.

____ 13. The type of insulation in your facility is a determining factor in the type of ventilation system you should install.

____ 14. Facilities should have at least two fans in each room.

May be photocopied for student use.

____ 15. Poor ventilation can cause the spread of respiratory diseases such as brucellosis.

____ 16. You must be able to control the buildup of moisture in the facility.

____ 17. Whether your building faces north or east can influence the type of ventilation system you should install.

____ 18. High concentrations of carbon dioxide in a poorly ventilated space can cause suffocation.

____ 19. An animal's ability to reduce its body heat is increased in the presence of high humidity.

____ 20. A good ventilation system must provide sufficient cfm of air according to the animals' size and level of stress due to crowding.

OBJECTIVE 11

Choose the word or phrase to complete statements about the use of disinfectants. Write the letter of the correct answer in the blank.

____ 1. A good disinfectant has all of the following characteristics **EXCEPT**

A. effective against a wide range of microorganisms
B. effective against all microorganisms
C. effective in a low concentration
D. can be applied easily in ordinary conditions

____ 2. Organic matter interferes with the germicidal action of the disinfectant and

A. protects microorganisms
B. resists corrosion
C. becomes caustic
D. can't be removed

____ 3. A good disinfectant has all of the following characteristics **EXCEPT**

A. noncaustic
B. nontoxic
C. nonantiseptic
D. noncorrosive

May be photocopied for student use.

____ 4. In selecting the type of disinfectant to use, you would consider the strengths and limitations of the product, economy, and the

A. size of your herd or flock
B. type of construction materials
C. types of microorganisms present
D. number of diseased animals

____ 5. JoAnn cleans her chicken house and mixes the disinfectant in hot water according to the label. She has to

A. apply it lightly so she'll have enough to finish the job
B. work quickly so she can get it applied before it cools
C. rinse it off within ten minutes
D. keep the chickens out for two weeks

____ 6. All of the following statements about the importance of good disinfection are true **EXCEPT**

A. disease-producing organisms can affect generation after generation of animals if they are not controlled
B. populations of animals of the same species or of different species living in the same environment encourage disease
C. the best disinfectants clean the surface of organic matter, grease and dirt, and kill germs in one operation at low cost
D. a successful livestock operation depends on a good disinfectant application program

____ 7. A good disinfectant has all of the following characteristics **EXCEPT**

A. can work effectively at low temperatures
B. stays stable in the presence of organic matter
C. stays stable in storage
D. stays stable in solution for a long period

May be photocopied for student use.

OBJECTIVE 12

Match disinfectants to their uses and descriptions. Write the letter of the correct answer the blank.

Part 1

A.	QAC	G.	orthophenylphenol
B.	cresols	H.	phenol
C.	formaldehyde	I.	potassium permanganate
D.	iodine	J.	hydrogen peroxide
E.	soaps	K.	acetic acid/lactic acid
F.	Lysol®	L.	unslaked lime

____ 1. oxidizing agent used for washing and cleansing wounds

____ 2. used as an equipment rinse and spray disinfectant against non-spore-forming bacteria; fast-acting, good deodorizing agent

____ 3. odorless disinfectant frequently used around dairy barns; also effective against tubercular organisms

____ 4. used to disinfect buildings after an outbreak of disease; destroys living tissue and can be highly poisonous

____ 5. used very effectively on the skin; also makes an excellent wash in which to soak instruments between their use on successive animals

____ 6. used with formaldehyde to fumigate buildings

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Part 2

A.	soaps	G.	sodium hydroxide
B.	Lysol®	H.	acetic acid/lactic acid
C.	formaldehyde	I.	potassium permanganate
D.	iodine	J.	hydrogen peroxide
E.	heat	K.	orthophenylphenol
F.	alcohol	L.	phenol

____ 1. boiling items for ten minutes will usually destroy most disease germs, excluding anthrax and tetanus

____ 2. used to remove oily compounds, organic matter, and bacteria from the skin; limited germicidal power

____ 3. used mainly as a skin disinfectant and in an emergency to disinfect instruments; not effective as an antimicrobial agent

____ 4. widely used as a germicide for milking equipment, and in stronger solutions used to kill the more resistant bacteria and viruses such as anthrax bacillus and hog cholera virus on floors, stalls, and pens

____ 5. considered one of the most efficient disinfectants, but too expensive and toxic for general use

____ 6. used as preservatives for food and feed because they prohibit the growth of many microorganisms

May be photocopied for student use.

Part 3

A.	QAC	G.	sodium hydroxide
B.	soaps	H.	unslaked lime
C.	formaldehyde	I.	detergents
D.	cresoles	J.	hydrogen peroxide
E.	chlorine	K.	orthophenylphenol
F.	Lysol®	L.	chlorhexidine

____ 1. used to sterilize water supplies, dairy equipment, dishes, and glassware; readily destroyed by organic material

____ 2. used with water to form calcium hydroxide, which is used as a whitewash on walls, floors, and certain types of equipment; also used to cover carcasses when burying them

____ 3. used as a bath in which to soak instruments between their use on successive animals

____ 4. used extensively because of their nontoxicity to living tissues

____ 5. a general-use disinfectant, reliable, available in many commercial preparations

____ 6. used to disinfect equipment and skin for castrating and tattooing and other procedures and for disinfecting surgical instruments

May be photocopied for student use.

Name _____ Score _____

OBJECTIVE 13

Choose the word or phrase to complete statements about caring for sick animals. Write the letter of the correct answer in the blank.

____ 1. To properly care for sick or injured animals, you should learn

A. first aid and how to give medications
B. the names and symptoms of all common diseases
C. how to administer anesthetic
D. how to identify bacteria under a microscope

____ 2. To avoid spreading an infectious disease or carrying bacteria to other animals, you would

A. take care of the sick animal first
B. sterilize your clothes and shoes
C. dip your shoes in disinfectant
D. wear a mask or respirator

____ 3. Check temperature, pulse, respiration rate

A. every hour
B. every four hours
C. twice a day
D. several times a day

____ 4. Taking care of a sick or injured animal includes all of the following **EXCEPT**

A. keeping sick animals in the same area
B. providing fresh water and food
C. keeping the animal warm
D. providing clean bedding

____ 5. All of the following are practices you should follow when caring for a sick heifer **EXCEPT**

A. confine her in a small space
B. assume that she has a zoonotic disease
C. make her comfortable
D. if she has an infectious disease, take a shower after handling her

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____ 6. During the day, you check on your sick ewe. You should observe her for diarrhea and

A. frequent urination
B. failure to urinate
C. *open-mouth breathing*
D. loss of appetite

____ 7. All sick or injured animals should be

A. disposed of
B. quarantined
C. isolated
D. medicated

____ 8. Of the following, the one which is PROBABLY MOST IMPORTANT in caring for sick animals is

A. having the right equipment
B. following your vet's instructions
C. reducing the animal's fever
D. relieving the animal's suffering

OBJECTIVE 14

Evaluated on Job Sheet 3.

OBJECTIVE 15

Discuss considerations for treating wounds.

1. What are the first two steps you would take with any injury?

_____

_____

2. You have a lamb that ran into a board with a nail sticking out of it. It looks like the lamb hit the nail with its shoulder, then moved forward, tearing the skin for about an inch and a half. The tear is not very deep, but has been bleeding for several minutes. Describe in order, the steps you would take to treat the wound.

_____

_____

_____

_____

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3. You're coming home from a stock show in late February and a steer trips and falls getting out of the trailer. He has broken his left back leg above the knee. It's a compound fracture, meaning that a piece of the bone has torn through the muscle and skin and is sticking out. The wound is bleeding, and the blood is dark red. Discuss how you will handle this situation. Include in your discussion the value of your bull, the steps you will take in dealing with this injury, and the factors that you must consider.

May be photocopied for student use.

OBJECTIVE 16

Evaluated on Job Sheet 4.

OBJECTIVE 17

Discuss major shelter requirements of livestock. Write a short paragraph about how each of the shelter requirements listed below can be met.

1. **proper environmental conditions**

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2. **affordable design, construction, and maintenance costs**

3. **convenience**

4. **durability**

5. **promoting dryness**

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6. **adequate lighting**

7. **safety**

8. **adequate space**

May be photocopied for student use.

Name _____ Score _____

OBJECTIVE 18

Select handling characteristics for cattle, swine, and sheep.
Write an "X" in the blank before each correct statement.

Cattle

____ 1. Nervous, docile, or balking animals should be identified with ear tags, spray paint, chalk marks, or another method.

____ 2. Mature animals should not be restrained with ropes alone.

____ 3. They are very stubborn and the slower you move, the faster you get the job done.

____ 4. Electric prods, whips, and dogs should be used regularly.

____ 5. They are difficult to lead or drive, especially in hot weather.

____ 6. They have poor eyesight and are easily frightened.

____ 7. People, dogs, closed gates, panels, and similar objects cause them to turn.

____ 8. Strangers affect animal behavior.

____ 9. They have a strong herding instinct.

____ 10. They are sensitive and will balk if yelled at.

Sheep

____ 1. They are stubborn and have definite ideas of their own.

____ 2. They are natural jumpers.

____ 3. Mature animals should not be restrained with ropes alone.

____ 4. People, dogs, closed gates, panels, and similar objects cause them to turn.

May be photocopied for student use.

____ 5. They are sensitive and will balk if yelled at.

____ 6. They are difficult to lead or drive, especially in hot weather.

____ 7. They are not intelligent and can't learn.

____ 8. They have a strong flocking instinct.

Swine

____ 1. They are stubborn and have definite ideas of their own.

____ 2. They are not athletic and can't stand very rough handling, especially in hot weather.

____ 3. They have poor eyesight and are easily frightened.

____ 4. They have an instinctive tendency to find a small opening and head for it, such as the space between your legs.

____ 5. They have a strong herding instinct.

____ 6. They are difficult to catch because their bodies are very smooth and can slip through your hands.

____ 7. They are easy to drive or pull because they usually want to go in where you go.

____ 8. They are not intelligent and will not learn.

____ 9. People, dogs, closed gates, panels, and similar objects cause them to turn.

____ 10. The faster you move, the faster you get the job done.

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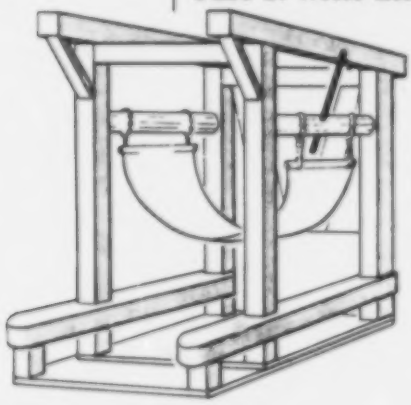
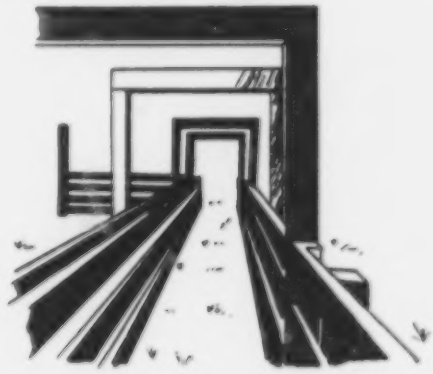
OBJECTIVE 19 | **Identify restraints for cattle, sheep, swine, and poultry.**

Part 1. Write the name of the restraint in the blank.



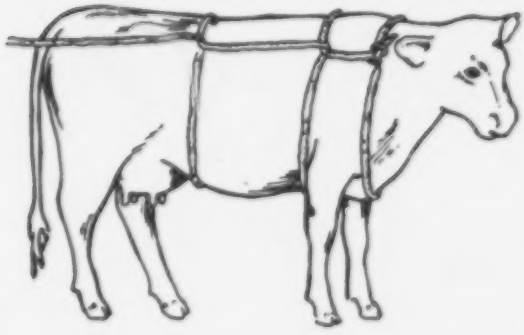
1. _____



2. _____

3. _____

4. _____



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6. _____

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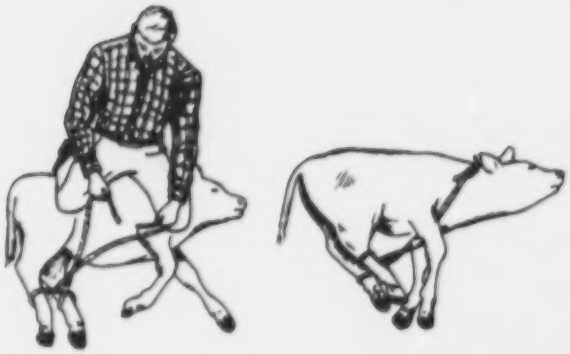
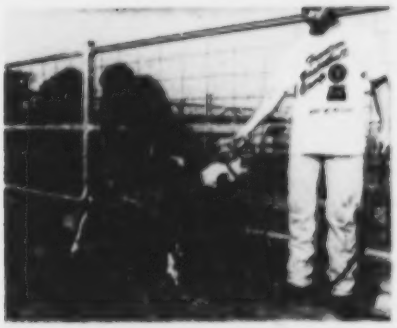


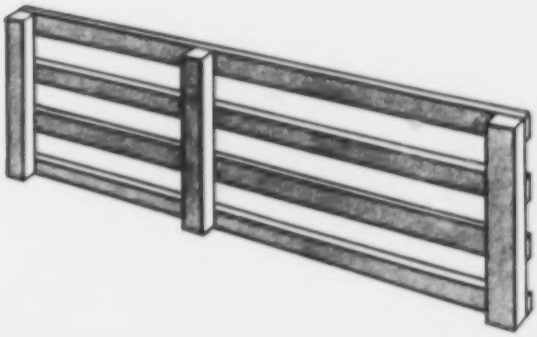
7. _____



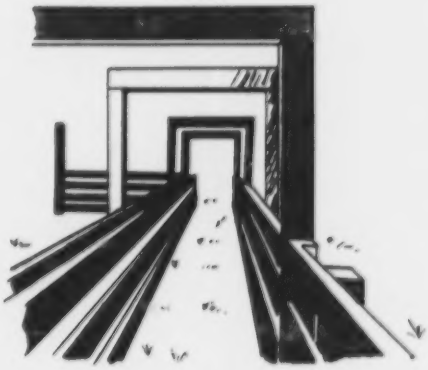
8. _____

9. _____

10. _____



11. _____



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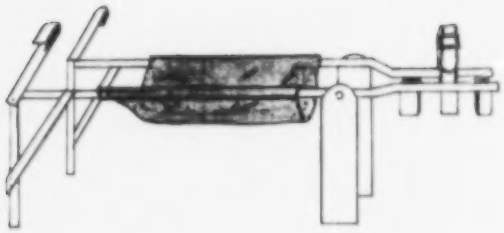


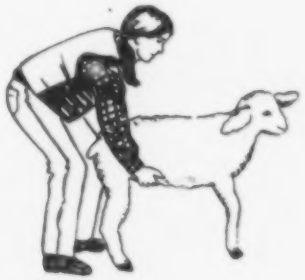
13._____

14._____

15._____

16._____

17._____



18._____

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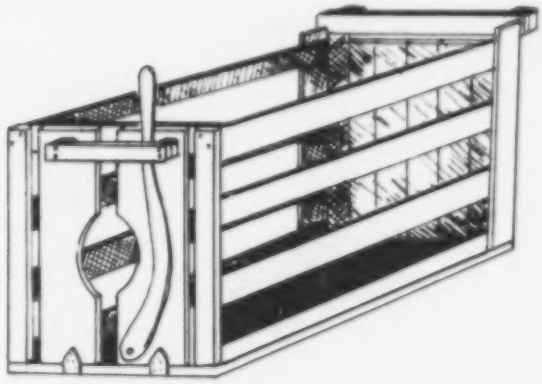
19. _____

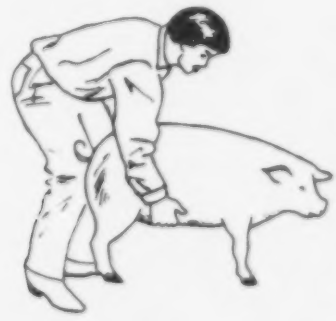
20. _____



21. _____

22. _____

23. _____



24. _____

May be photocopied for student use.

25._____

Part 2. Write the letter of the correct answer in the blank.

POULTRY

____ 1. If you are left-handed, you want to maneuver the chicken until its head is facing toward

A. your left
B. your right
C. the door
D. the rear

____ 2. The first step in handling the bird is to use your dominant hand to

A. slide under the bird's breast and grasp the opposite wing with your thumb
B. slide under the bird's breast and hold down the wing on the same side
C. reach over the bird's back and grasp the opposite wing
D. reach over the bird's back and grasp the wing on the same side

____ 3. Pulling the chicken toward you with its head pointed toward the coop door is step

A. three
B. four
C. five
D. six

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____ 4. Lift the chicken from the coop with

A. your dominant hand on the wings
B. your nondominant hand grasping the legs
C. the head pressed down to the chest
D. head first

____ 5. If you are right-handed, you would put the bird back in the coop

A. facing left, head first
B. facing right, head first
C. facing left, tail first
D. facing right, tail first

OBJECTIVE 20

Select true statements about chemical restraints. Write an "X" in the blank before each true statement.

____ 1. Chemical restraints are available only from a veterinarian.

____ 2. A local anesthetic causes the animal's muscles to relax so it is calm and doesn't resist treatment.

____ 3. Tranquilizers deaden the pain and make the animal gentle enough for easy handling and treatment.

____ 4. A tranquilizer is used to calm an animal that may be injured and frightened or too wild to work on.

____ 5. A local anesthetic is used at the site of an injury to deaden the nerve endings so the animal doesn't feel pain and the wound can be treated.

____ 6. Oral restraints are given using a syringe with a needle 3/4 of an inch long to inject the animal in the mouth.

____ 7. An intramuscular injection is made deep into large muscles using a needle at least 1/4 inch long.

____ 8. Chemical restraints may be administered orally or by intramuscular injection.

____ 9. Chemical restraints react with the animal's body to deaden pain or to calm or tranquilize it.

____ 10. Chemical restraints are used to force animals not to resist treatment.

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____ 11. Orally administered chemicals are absorbed through the mucous membranes.

____ 12. Tranquilizers affect the nervous system, slowing down the nerve impulses to and from the brain.

OBJECTIVE 21 **Evaluated on Job Sheet 5.**

OBJECTIVE 22 **Evaluated on Job Sheet 6.**

OBJECTIVE 23 **Evaluated on Job Sheet 7.**

C-49

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Animal Welfare, Animal Rights, and You

You have probably heard the terms "animal welfare" and "animal rights." It's possible that you heard one or both of them spoken in a derogatory way because in the 1980s and 1990s these two terms have been points of controversy. For some people, they represent opposing points of view. Because both of these terms refer to animal health, safety, and comfort, they have become emotional issues, generating strong feelings, intense media coverage, heightened language, and distorted information – on both sides.

Whenever people in a democracy try to create change in a fundamental belief or policy, there will be anger and conflict. Your responsibility as someone who works in animal production is to be able to differentiate opinion from fact and appropriate responses from hysterical responses. You must learn what the facts are, study the research, and determine what is right morally, ethically, and financially for yourself and your operation.

As you read this information, think about what changes might occur, what practices may stay the same, and what effect this issue might have on you and your career in animal production.

In general "animal welfare" refers to the idea that animals should be cared for responsibly, treated humanely, and if they are used for food, the process should be as painless as possible.

"Animal rights" refers to the idea that animals should be free to live their lives without interference from people. At one end of the debate are people who believe that animals should have the same rights as people and should not be made to produce or work for human benefit. Animals should not be abused or killed for food, sport, or any other reason; should be permitted to breed at will; and that all people should be vegans (pronounced *vedg-uns* or *vee-guns*), meaning that we should use no animal products for food or any other purpose. They maintain that animals should not be used for research.

Some animal rights advocates are not so extreme. Another point of view holds that animals may be used for human food and human benefit, but they should be happy, live in a natural environment, and be free from stress and discomfort. They say animals should not be confined in small spaces; should not be given drugs that affect their physiological systems or that can be transferred to humans; and should not be subjected to painful management practices such as castration, docking, branding, dehorning, and debeaking.

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There is nothing the livestock producer can do about the former, extreme position. People who feel that animals should not be killed will not eat meat or use animal products. However, the concerns of the second group are creating changes in management practices and may continue to do so. Some of these concerns will benefit both the animal and the producer because a contented, unstressed animal will be healthier and more efficient. Other concerns will increase consumers' prices and decrease producers' profits. Even though organizations such as People for the Ethical Treatment of Animals (PETA) protest that chickens are confined in small cages where they can't run or stretch their wings, most consumers still want to pay only 89 cents a dozen for eggs (or the current price as you're reading this) and not two or three times that amount to compensate for increased labor, disease, and injury.

Animal welfare has always been important to agricultural people because healthier animals are better producers. While animals have lost most of their freedom to roam and breed at will, they have gained year-round, high quality feed and clean water; good veterinary care; and shelter with a controlled (heated, ventilated, clean) environment. They have protection from competitors (for food and females), predators, parasites, poisoning, and diseases. They produce more live offspring. While their life-span may be shorter, it is usually healthier: untended animals may overeat, fight, or be injured and suffer until they are found or die.

If animals are fed regularly and housed so they are not threatened by predators, they don't need weapons for protection. Horns and beaks can cause injury to other animals, humans, and property. Dehorning and debeaking reduce the possibility of injury. An animal rights person sees these procedures as "cruel," but the producer sees them as ultimately healthier and more humane for the animal.

One compromise that could work to reduce stress for animals and still allow producers to meet their needs is freeze branding. Animals have to be marked in some way so the owner can verify ownership, keep accurate records, and handle the herd effectively. For many generations, hot iron branding has been the most popular method of identification. It sears the skin, causing a burn that is susceptible to infection until it heals and leaving the scar that identifies the animal. As you can imagine, it's painful and no anesthetic is used to numb the area.

Freeze branding uses liquid nitrogen cooled to -320°F and applied to the skin, either to kill the pigment (color) in the hair follicle or to kill the follicle and prevent hair from growing on the branded area. Animals are permanently marked, but feel very little pain.

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Each concern that moderate animal rights activists express has a rational purpose in livestock production. They oppose the use of drugs, such as hormones and additives. While hormones and additives are not required for animal health, they do improve immunity against disease, as well as increase production, create a more desirable consumer product, and keep costs down.

Animal rights people strongly oppose confinement. But confinement means the handler can provide better care and can keep a close eye on all the animals. Furthermore, today's animals have lived inside of fences, stalls, and cages for so many years that they have been bred for confinement production. They are not the same animals as their wild ancestors and have become dependent on the care and controls that such operations provide.

Methods for animal rights advocates range from letters to the editor, legal petitions, marches, and demonstrations to violent attacks on livestock and animal research facilities. Because it is an emotional cause, it attracts emotional support such as public appearances by celebrities and media coverage with gross, graphic photographs of animals suffering. People who do not have information become incensed and join the fight, making farmers and ranchers the "enemy."

Everyone in animal production *must* be concerned about animal welfare. If you didn't care about animals, you wouldn't be in this class learning the best ways to care for them.

The strongest supports for animal producers are education and good scientific research. Agriculture has a strong political voice in this country. The Farm Animal Welfare Coalition (FAWC) and the Animal Industry Foundation (AIF) represent the interests of the livestock and poultry industries. The AIF supports public education and solid scientific research in the animal rights arena.

On the other side of the debate, animal rights activists have a strong emotional appeal and a large public following. They also have a lot of money for media coverage donated by people who support their cause.

This controversy will continue and may grow even more intense before a productive compromise is reached. People who believe in animal rights will fight hard to "save the animals." And they have the right to pursue their beliefs in a legal manner through the freedoms granted them by the Constitution of the United States.

By the same token, people who are in agriculture have a responsibility to use wholesome production methods, and to use valid information and research to support their positions.

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You have a responsibility to read, listen, and evaluate the information from both sides and to act on your judgement based on reason and experience. That may mean voting to protect your rights as a farmer, rancher, or agricultural employee. It may mean making adjustments to your management program. It may mean giving money to support a lobby group to fight for you in Congress, or it may mean speaking to a club in your community to educate people about animal welfare.

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Types of Injuries

☞ **NOTE:** Observe the bleeding with all types of injuries. Bleeding flushes the wound, carrying germs from the inside of the body to the outside. The type of blood flow (spurting or even) and the color of the blood (bright red or dark red) can indicate whether a major blood vessel has been cut or torn.

- **abrasions** – injuries that damage the outer layer of the skin, as when the skin is scraped against a hard surface (scraping your knee when falling off a bicycle); limited bleeding

- **incisions or cuts** – a straight, smooth-edged cut through the skin or body tissues as you would get from a knife blade, edge of metal, broken glass, etc.; heavy, rapid bleeding

  If the cut is deep, muscles, tendons, and nerves may be damaged.

- **lacerations** – a tear or cut with jagged edges; a blunt-edged breaking or tearing of the soft tissues, as when you are hit with something so hard that it breaks the skin and underlying tissues (lacerations are common in automobile accidents); extensive, rapid bleeding

  There is far more tissue damage in a laceration than in a cut, and the surrounding tissues are damaged. Contamination can get deep into the tissues, increasing the possibility of infection.

- **punctures** – a small hole in the tissues caused by an object piercing the skin layers, as when you step on a nail, or an animal is punctured by barbed wire or horns; limited external bleeding, but there may be internal damage to the organs that cause internal bleeding

  The possibility of infection is increased because the limited external bleeding doesn't flush out the wound.

- **avulsions** – injuries in which tissue is cut or torn from the body, as often happens in car accidents or serious animal fights; heavy, rapid bleeding

  Cuts and lacerations are usually present with avulsions.

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LAP SHEET	*LIVESTOCK DISEASES AND PARASITES*	**C-2**

Check the blank as you complete each step.

1. **Take**	___ the pretest provided by your instructor. Have your instructor evaluate your completed test. After your test has been evaluated, follow your instructor's recommendations.
2. **Read**	___ the introduction, unit objective, and specific objectives.
3. **Do**	___ the focus assignments.
4. **Stop**	___ and have your instructor evaluate your work from the focus assignment. After your work has been evaluated, follow your instructor's recommendations.
5. **Study**	___ the Information Sheet, objective 1.
Optional: **Share**	___ your experiences with parasites, or disease\parasite prevention with the class.
Optional: **Talk**	___ with a vet or a stock manager about prevention programs.
Optional: **Visit**	___ a farm to identify signs of good health and observe measures that prevent disease.
6. **Study**	___ the Information Sheet, objective 2.
7. **Ask**	___ your instructor to show you Transparency 1.
Optional: **Research**	___ the life cycle of other internal parasites.
8. **Study**	___ the Information Sheet, objective 3.
Optional: **Look up**	___ photos of animals infected with internal parasites.

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Optional: Talk	___	with a vet about the internal parasites in your region.
Optional: Obtain	___	and observe specimens of internal parasites.
9. Study	___	the Information Sheet, objective 4.
10. Ask	___	your instructor to show you Transparencies 2 and 3.
Optional: Research	___	the life cycle of other external parasites.
11. Study	___	the Information Sheet, objective 5.
Optional: Look up	___	photos of animals infected with external parasites.
Optional: Talk	___	with a vet about the common external parasites that affect your region.
Optional: Obtain	___	and observe specimens of external parasites.
Optional: Visit	___	a farm and observe animal behavior under the influence of external parasites.
12. Study	___	the Information Sheet, objective 6.
Optional: Visit	___	a farm with an effective parasite control program.
Optional: Visit	___	a farm with a poor parasite control program.
Optional: Prepare	___	a parasite control program for a hypothetical farm.
13. Do	___	Assignment Sheet 1.
14. Stop	___	and have your instructor evaluate your work from the Assignment Sheet. After your work has been evaluated, follow your instructor's recommendations.

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15. **Study**	___	the Information Sheet, objective 8.
Optional: **Look up**	___	photos of animals with infectious diseases.
Optional: **Share**	___	any experiences you have had related to infectious diseases in animals or humans with the class.
Optional: **Talk**	___	with a vet about the infectious diseases that affect your region.
16. **Study**	___	the Information Sheet, objective 9.
Optional: **Look up**	___	photos of animals with noninfectious diseases.
Optional: **Share**	___	any experiences you have had related to noninfectious diseases in animals or humans with the class.
Optional: **Talk**	___	with a vet about the noninfectious diseases that affect your region.
Optional: **Visit**	___	a farm or a veterinary clinic and observe animals suffering from disease.
17. **Study**	___	the Information Sheet, objective 10.
Optional: **Share**	___	any experiences you have had related to disease prevention programs with the class.
Optional: **Talk**	___	with a vet about disease prevention.
Optional: **Visit**	___	a farm that follows a strong disease prevention program.
Optional: **Visit**	___	a farm that follows a weak disease prevention program.

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Optional:
Prepare ___ a disease prevention program for a hypothetical farm.

18. Do ___ Assignment Sheet 2.

19. Stop ___ and have your instructor evaluate your work from the Assignment Sheet. After your work has been evaluated, follow your instructor's recommendations.

20. Take ___ the posttest provided by your instructor. Have your instructor evaluate your completed test. After your test has been evaluated, follow your instructor's recommendations.

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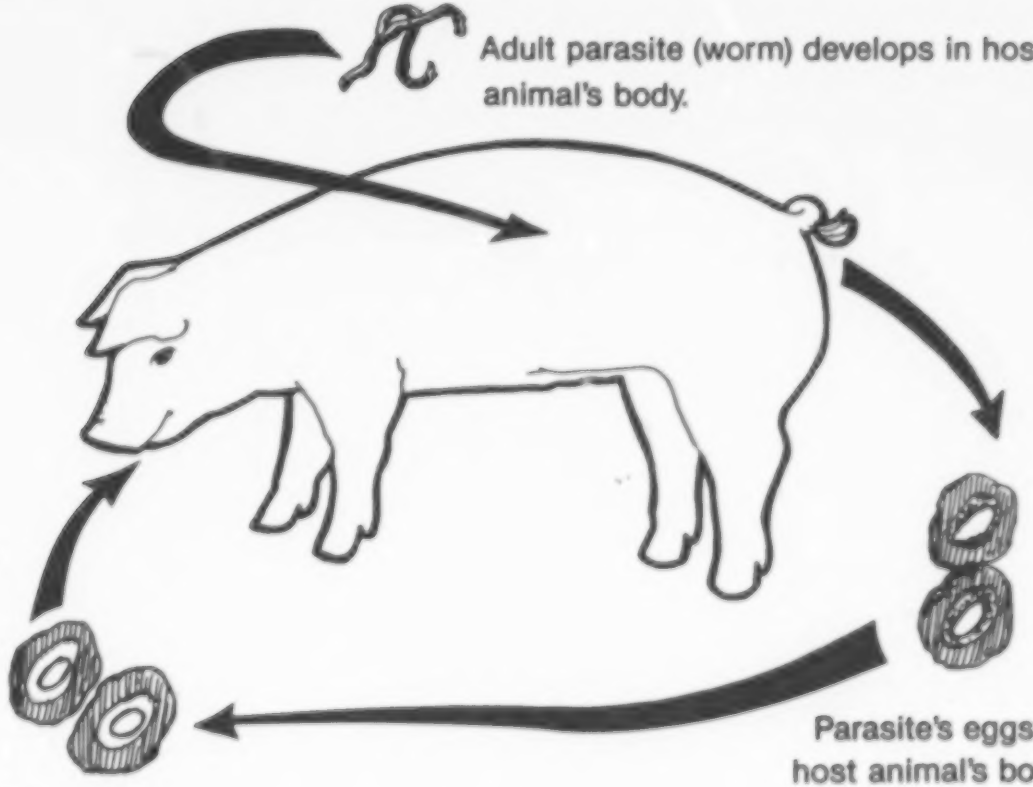
Life Cycle of an Internal Parasite
(Swine Intestinal Ascarid - Roundworm)


Adult parasite (worm) develops in host animal's body.
Parasite's eggs are eaten by host animal.
Parasite's eggs pass from host animal's body in feces.

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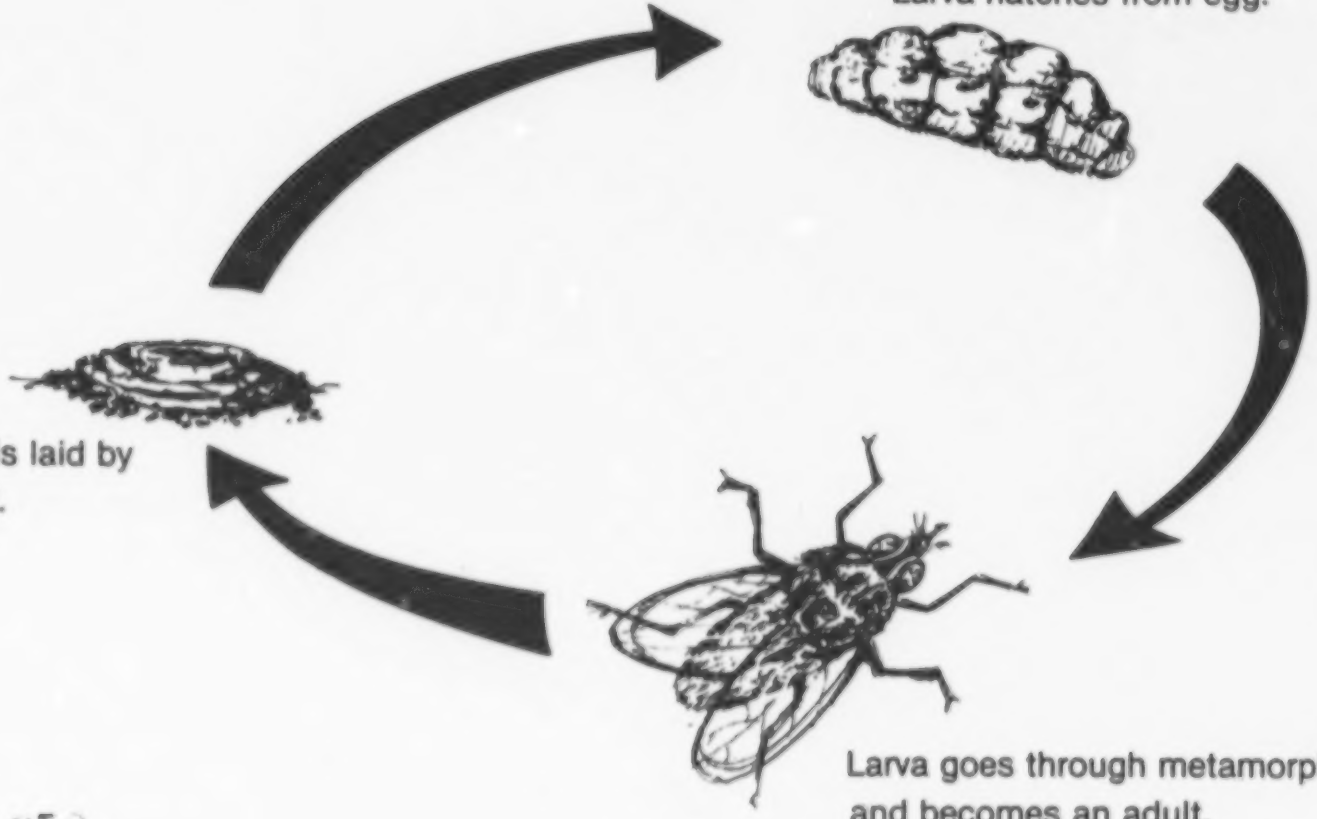
INSTRUCTOR'S RESOURCE PACKAGE - Animal Science
TRANSPARENCY MASTER 1 - CIMC - C-2 - 1

Life Cycle of an External Parasite (The Horn Fly)



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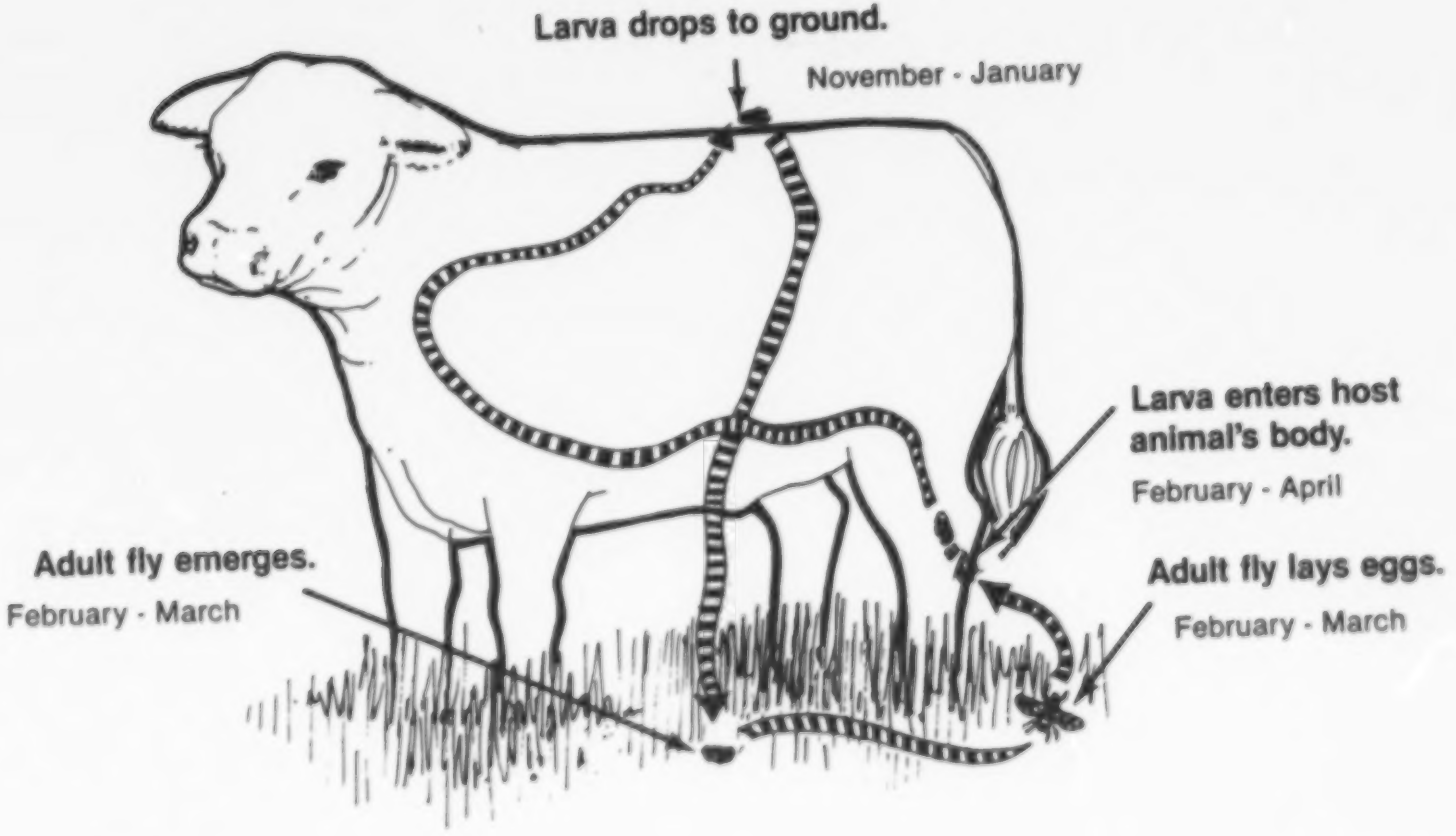
INSTRUCTOR'S RESOURCE PACKAGE - Animal Science
TRANSPARENCY MASTER 2 - CIMC - C-2 - 1

Life Cycle of the Heel Fly or Cattle Grub



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INSTRUCTOR'S RESOURCE PACKAGE - Animal Science
TRANSPARENCY MASTER 3 - CIMC - C-2 - 1

WRITTEN TEST

LIVESTOCK DISEASES AND PARASITES

C-2

Name _____ Score _____

OBJECTIVE 1

Choose the word or phrase to complete statements about livestock diseases and parasites. Write the letter of the correct answer in the blank.

_____ 1. The costs due to disease and parasites include death, medication, poor feed conversion, and

A. short reproductive interval
B. long reproductive interval
C. improved growth
D. decreased overhead

_____ 2. Signs of good health include contentment, alertness, eating with relish, and

A. passive behavior
B. appropriate weight
C. white eye membrane
D. firm, tough skin

_____ 3. Proper carcass disposal targets

A. diseases
B. parasites
C. both diseases and parasites
D. hosts

_____ 4. Immunization targets

A. diseases
B. parasites
C. both diseases and parasites
D. hosts

May be photocopied for student use.

____ 5. Proper pasture rotation targets

A. diseases
B. parasites
C. both diseases and parasites
D. hosts

____ 6. Insecticides target

A. diseases
B. parasites
C. both diseases and parasites
D. hosts

____ 7. Proper manure disposal targets

A. diseases
B. parasites
C. both diseases and parasites
D. hosts

____ 8. Accurate record keeping targets

A. diseases
B. parasites
C. both diseases and parasites
D. hosts

____ 9. Vital statistics include all of the following **EXCEPT**

A. temperature
B. pulse rate
C. weight
D. respiration rate

OBJECTIVE 2

Arrange in order the life cycle stages of an internal parasite. Write a "1" in the blank before the first step, a "2" in the blank before the second step, and so on.

____ The eggs pass out of the host's body through its feces.

____ The cycle begins again.

____ The parasite lays its eggs in the host's intestinal tract.

____ Another animal ingests contaminated feedstuffs or water.

____ The parasite (intestinal roundworm) matures in the host's intestinal tract.

May be photocopied for student use.

OBJECTIVE 3

Match common internal parasites to their descriptions. Write the letter of the correct answer in the blank.

A. heart worms
B. liver flukes
C. gastrointestinal worms
D. lung worms
E. coccidia
F. stomach worms
G. heart flukes
H. stomach flukes
I. tapeworms
J. ascarid

_____ 1. Large, yellowish or pinkish roundworms found in swine. The migrating larvae produce liver damage and lung lesions resulting in pneumonia.

_____ 2. Protozoan organisms which produce diarrhea and bloody feces in cattle, sheep, and poultry.

_____ 3. Any of a number of species of worms found in the stomach, small intestine, and colon of cattle, sheep, swine, and poultry. The worms cause loss of weight, anemia, and/or diarrhea.

_____ 4. Flattened, leaflike brown worms that are usually one inch long and cause severe liver damage, anemia, and loss of weight in cattle, sheep, swine, and poultry.

_____ 5. White, threadlike worms, 1½ to 3 inches long, found in the trachea and bronchi of cattle, sheep, and swine. The worms cause coughing, labored breathing, and loss of appetite.

_____ 6. Threadlike worms, ¾ to 1½ inches long, primarily found in the stomach of sheep and to a lesser extent swine and cattle. The worms cause anemia, loss of weight, and weakness.

_____ 7. Long, ribbonlike worms that infest the intestine of cattle, sheep, swine, and poultry. There are no marked or specific symptoms.

May be photocopied for student use.

OBJECTIVE 4

Arrange in order the life cycle stages of external parasites. Write a "1" in the blank before the first step, a "2" in the blank before the second step, and so on.

Life cycle of a horn fly:

_____ The eggs hatch into larvae in the manure.

_____ The cycle begins again.

_____ The parasite (horn fly) feeds off the body of the host and deposits eggs in manure.

_____ The larva goes through a metamorphosis and becomes an adult horn fly that feeds on animals.

Life cycle of a heel fly or cattle grub:

_____ The mature larvae emerge through the hole and drop to the ground.

_____ The eggs hatch and the larvae burrow into the skin.

_____ The cycle begins again.

_____ The adult fly emerges from the larvae.

_____ The parasite (heel fly or cattle grub) lays its eggs on the hair of the animal's hind legs, flanks, or sides.

_____ The larvae migrate through the body to the host's back, where they make a hole for breathing.

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OBJECTIVE 5

Match common external parasites to their descriptions. Write the letter of the correct answer in the blank.

A. blowfly
B. louse
C. barn fly
D. mite
E. horsefly
F. house fly
G. tick
H. horn fly
I. cattle fly
J. heel fly (cattle grub)

____ 1. Any of a number of species of flies, all of which breed in the flesh, causing maggots to spread over the host's body and feed on the skin surface. (found on cattle, sheep, swine, and poultry)

____ 2. Fly that attacks the heels of cattle in early spring or summer, causing the host to run madly with its tail over its back in an attempt to escape. Larval stage causes swelling on the host's back, usually from December to May. (found on cattle)

____ 3. Small fly often found resting at the base of the horn on cattle. The infected animal refuses to graze during the day and seeks protection by hiding in dark buildings, brush, or tall grass.

____ 4. Biting fly that inflicts a painful bite and causes a heavily attacked animal to stop grazing. (found on cattle)

____ 5. Small, flattened, wingless parasite that causes intense irritation and restlessness and may cause severe itching. (found on cattle, sheep, swine, and poultry)

____ 6. Small parasite that causes mange, a marked irritation and crusting over of the skin accompanied by the formation of a thick, tough, wrinkled skin. (found on cattle, sheep, swine, and poultry)

____ 7. Any of several species that feed exclusively on blood. A heavy infestation will cause a host animal to lose weight and become anemic and lethargic. (found on cattle, sheep, swine, and poultry)

May be photocopied for student use.

OBJECTIVE 6

Discuss parasite control. Write your answers in the blanks.

1. What are the three primary methods for combating parasites?

   _____

   _____

   _____

2. You are starting a swine farm. What are five sanitation procedures that you should incorporate into your operation?

   _____

   _____

   _____

   _____

   _____

3. Who should you contact prior to using anthelmintics or insecticides?

   _____

4. You think that some of your stock is infected with internal parasites. A friend suggests that you use some insecticides. Should you take his advice? Why?

   _____

   _____

   _____

OBJECTIVE 7

Evaluated on Assignment Sheet 1.

CC:

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OBJECTIVE 8

Match common infectious diseases to their descriptions. Write the letter of the correct answer in the blank.

Part 1:

A. shipping fever	G. pneumonia
B. avian pox	H. brucellosis (Bang's disease)
C. mycoplasmosis	I. vibriosis
D. erysipelas	J. atrophic rhinitis
E. coryza	K. warts
F. blackleg	L. omphalitis

____ 1. A serious and widespread bacterial disease affecting cattle, swine, and rarely sheep. The most characteristic symptom is abortion and retained placenta.

____ 2. A very infectious, highly fatal bacterial disease affecting young cattle and sheep. Symptoms in cattle include lameness and swelling, high fever, and stiffness. Symptoms in sheep include swelling in the region of a recent wound from shearing, castrating, docking, or bruising.

____ 3. A bacterial infection usually affecting young swine under 80 pounds. Symptoms include persistent sneezing and a snout that begins to wrinkle, bulge, and thicken when the pig is from 4 to 8 weeks old.

____ 4. A bacterial infection that affects poultry. Symptoms include nasal discharge, coughing, sneezing, loss of weight, swelling below the eyes, and reduced egg production.

____ 5. A bacterial or viral disease that affects cattle and sheep. The symptoms develop rapidly and last for a week or less. Symptoms include fever, discharge from eyes and nose, difficult breathing, and a hacking cough.

____ 6. A viral disease that is usually seen on cattle and may affect other animals. The symptoms include growths that may appear anywhere on the body and range in size from very small to very large.

____ 7. A viral infection that affects poultry. Symptoms include wartlike scabs around the head and comb and yellow cankers in the mouth and eyes.

May be photocopied for student use.

Part 2:

A. vibriosis	G. aspergillosis (Brooder pneumonia)
B. enterotoxemia	H. transmissible gastroenteritis (TGE)
C. foot rot	I. swine influenza
D. fowl cholera	J. erysipelas
E. botulism	K. bovine rhinotracheitis (red nose)
F. bronchitis	L. leptospirosis

____ 1. An infectious disease caused by a fungus that affects poultry. Symptoms include loss of appetite, gasping, and loss of weight.

____ 2. A condition that results when the bacterial population in the gut changes due to change in feed, failure to feed properly, or environmental stress. Symptoms are acute diarrhea, abdominal pain, and convulsions; results in death.

____ 3. A bacterial disease that usually affects young swine. Symptoms include high fever; edema of the nose, ears, and limbs; and possibly purplish patches under the swine's belly.

____ 4. A viral disease that affects cattle. Symptoms include going off feed and losing weight, coughing, pain in swallowing, slobbering, and nasal discharge.

____ 5. A disease caused by bacteria that affects primarily chicken broiler breeders. Symptoms include nasal discharge, swelling of the sinus, and inflammation of the eye.

____ 6. A viral infection that affects swine and is most severe in young animals, where the mortality rate approaches 100%. The mortality rate decreases with age, almost never causing death in adult swine. Symptoms include scouring (in all cases) and vomiting (in some cases).

____ 7. A viral disease that affects poultry. Symptoms include difficult breathing, sneezing, gasping, nasal discharge, reduced egg production, loss of weight, and death.

May be photocopied for student use.

Part 3:

A. coryza
B. pneumonia
C. vibriosis
D. swine influenza
E. avian influenza
F. atrophic rhinitis
G. omphalitis
H. foot rot
I. bursal disease (Gumboro)
J. salmonella and paracolon
K. coliform infections (colibacillosis)
L. mastitis

____ 1. A viral disease that affects poultry. Symptoms include coughing, sneezing, and loss of weight.

____ 2. A disease that affects cattle, sheep, and swine. Symptoms include lameness and a hoof infection with a characteristic foul odor.

____ 3. A viral disease that affects young poultry. Symptoms include fever, ruffled feathers, loss of appetite, difficulty in defecation, slight tremors, dehydration, and unsteady movement.

____ 4. A bacterial infection affecting cattle, sheep, and swine. In acute form, the udder is hot, very hard, and tender. Other symptoms are elevated temperature, loss of appetite, awkward movement (due to the tenderness of the udder), and greatly reduced milk production.

____ 5. An inflammation of the lungs that has many causes and affects all animals. Symptoms include quick, shallow respiration, crackling noises with breathing, and elevated temperature.

____ 6. An infectious disease that affects cattle, sheep, swine, and poultry. Symptoms vary depending on the pathogen but may include diarrhea, droopiness, chilling, loss of appetite, thirst, and death.

____ 7. A viral disease that affects swine. The symptoms appear suddenly. They include high fever, loss of appetite, cough, and discharge from the eyes and nose.

____ 8. A number of bacterial infections that affect cattle, sheep, swine, and poultry. Symptoms vary but may include diarrhea, droopiness, chilling, loss of appetite, thirst, and death.

May be photocopied for student use.

Part 4:

A. atrophic rhinitis	G. botulism
B. rabies	H. enterotoxemia
C. coryza	I. vibriosis
D. pinkeye	J. salmonella (and paracolon)
E. leptospirosis	K. bursal disease (Gumboro)
F. omphalitis	L. brucellosis (Bang's disease)

____ 1. A disease caused by poultry eating decayed material which contains bacterial toxins. Symptoms include weakness, trembling, paralysis, loose feathers, and closed eyes.

____ 2. A bacterial disease that affects older poultry. Symptoms include swelling around the eyes and wattles, nasal discharge, swollen sinuses, and reduced egg production.

____ 3. A bacterial disease that affects cattle, sheep, and swine. The symptoms, which are usually mild, include fever, poor appetite, abortion, bloody urine, anemia, and ropy milk.

____ 4. A bacterial disease that affects young poultry. Symptoms include loss of appetite, diarrhea, drowsiness, and death.

____ 5. A bacterial or viral eye ailment that affects cattle and sheep. The symptoms include liberal flow of tears, a tendency to keep the eyes closed, and a redness and swelling of the lining membranes of the eyelids.

____ 6. A bacterial disease that affects cattle and sheep. Symptoms include many abortions among ewes, especially during the last four to six weeks of pregnancy, and abortion among cattle during the middle third of pregnancy.

____ 7. A viral infection that has been seen with growing frequency in domestic cattle, sheep, and swine. Symptoms include loss of appetite, anxiety, madness, and usually results in death.

May be photocopied for student use.

OBJECTIVE 9

Match common noninfectious diseases to their descriptions.
Write the letter of the correct answer in the blank.

A. calcium deficiency
B. frothy bloat
C. founder
D. diarrhea
E. milk fever
F. cholera
G. anemia, nutritional
H. scours
I. free gas bloat

____ 1. An iron deficiency that affects all farm animals. Symptoms include loss of appetite, progressive emaciation, and death.

____ 2. A nutritional disease caused by a high-concentrate, low-roughage diet which produces trapped, fermented gas. Symptoms include distention of the paunch, protrusion of the anus, respiratory distress, struggling, and death if not treated.

____ 3. A nutritional disease generally caused by overeating (grain, lush legumes, or grass) or overdrinking that affects cattle and sheep. Symptoms include fever, extreme pain, reluctance to move, and abnormal hoof growth.

____ 4. A nutritional disease caused by low blood calcium that affects sheep and cattle, usually high-producing cows after parturition. The symptoms develop within three days of parturition. Symptoms include loss of appetite, constipation, general depression followed by nervousness, and finally, collapse.

____ 5. A condition that results when young cattle and swine have been weaned early. Symptoms include cold, clammy skin; weakness; severe depression; and a watery, whitish or yellow, foul-smelling diarrhea.

____ 6. A disease that results from activities that cause an accumulation of gas in the rumin, such as lying too long on the side.

May be photocopied for student use.

OBJECTIVE 10

Discuss disease prevention. Write your answers in the blanks.

1. When would you quarantine animals?

_____

_____

_____

2. What are the three primary methods for preventing diseases?

_____

_____

_____

3. Name four proper sanitation techniques?

_____

_____

_____

_____

4. A friend has decided to get out of the cattle business because he has had trouble fighting diseases. He offers to sell you his stock at a greatly reduced price. Should you take his offer? Why or why not?

_____

_____

_____

_____

_____

OBJECTIVE 11

Evaluated on Assignment Sheet 2.

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LAP SHEET	NUTRITION, FEEDS, AND ADDITIVES	C-3

Check the blank as you complete each step.

1. Take	___	the pretest provided by your instructor. Have your instructor evaluate your completed test. After your test has been evaluated, follow your instructor's recommendations.
2. Read	___	the introduction, unit objective, and specific objectives.
3. Do	___	the focus assignments.
4. Stop	___	and have your instructor evaluate your work from the focus assignment. After your work has been evaluated, follow your instructor's recommendations.
5. Study	___	the Information Sheet, objective 1.
Optional: Ask	___	your instructor to give you information on the cost of feeds and additives in your program and in students' projects.
Optional: Ask	___	your instructor to give you information on the total amount of veterinary care and expenses required for your program and determine how much was related to nutrition.
6. Study	___	the Information Sheet, objective 2.
7. Ask	___	your instructor to show you Transparency 1.
8. Study	___	the Information Sheet, objective 3.
9. Ask	___	your instructor to show you Transparency 2.
10. Study	___	the Information Sheet, objective 4.
11. Ask	___	your instructor to show you Transparency 3.
12. Study	___	the Information Sheet, objective 5.

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Optional: Read	___	magazine articles and OSU Facts Sheets on nutrition and report to the rest of the class on your reading.
Optional: Watch	___	a video on nutrition.
13. Do	___	Assignment Sheet 1.
14. Stop	___	and have your instructor evaluate your work from the Assignment Sheet. After your work has been evaluated, follow your instructor's recommendations.
15. Ask	___	your instructor for the nutritional deficiency forms completed by the other students. (You will need these forms to complete Assignment Sheet 11.)
16. Study	___	the Information Sheet, objective 7.
Optional: Visit	___	a local feed supplier and investigate the different categories of feed available.
17. Study	___	the Information Sheet, objective 8.
Optional: Read	___	OSU Facts Sheet F-3502, *Feedstuff Composition for Swine Rations.*
Optional: Examine	___	the ingredients in the feeds used in your program.
18. Study	___	the Information Sheet, objective 9.
Optional: Ask	___	your instructor to show you a video on BST, a growth hormone used to increase milk production in cows.
Optional: Talk	___	to a local livestock manager about the use of additives.
19. Do	___	Assignment Sheet 2.
20. Ask	___	your instructor to recommend locations where you can obtain three commercial feed tags needed to complete the Assignment Sheet.

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21. **Stop**	___	and have your instructor evaluate your work from the Assignment Sheet. After your work has been evaluated, follow your instructor's recommendations.
22. **Study**	___	the Information Sheet, objective 11.
Optional: Visit	___	a local feed supplier to investigate the types of feed available.
23. **Do**	___	Assignment Sheet 3.
24. **Stop**	___	and have your instructor evaluate your work from the Assignment Sheet. After your work has been evaluated, follow your instructor's recommendations.
25. **Study**	___	the Information Sheet, objective 13.
Optional: Visit	___	several local livestock operations to see different storage and handling practices.
26. **Do**	___	Assignment Sheet 4.
27. **Ask**	___	your instructor for assistance in finding storage facilities to visit.
28. **Stop**	___	and have your instructor evaluate your work from the Assignment Sheet. After your work has been evaluated, follow your instructor's recommendations.
29. **Study**	___	the Information Sheet, objective 15.
Optional: Ask	___	your instructor to show your Transparency 4.
30. **Study**	___	the Information Sheet, objective 16.
31. **Ask**	___	your instructor for Handout 1.
Optional: Talk	___	to a livestock manager who utilizes net-energy about the practical applications of net-energy.
32. **Study**	___	the Information Sheet, objective 17.
33. **Ask**	___	your instructor to show you how to use the Pearson Square method of calculating rations.

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34. **Do**	___	Assignment Sheet 5.
35. **Stop**	___	and have your instructor evaluate your work from the Assignment Sheet. After your work has been evaluated, follow your instructor's recommendations.
36. **Ask**	___	your instructor for Handouts 2, 3, 4, 5, and 6.
37. **Do**	___	Assignment Sheet 6.
38. **Stop**	___	and have your instructor evaluate your work from the Assignment Sheet. After your work has been evaluated, follow your instructor's recommendations.
39. **Ask**	___	your instructor for the AUTONRCA program, the instruction sheet, and the OSU Current Report No. 3027, *Spreadsheet Programs for Calculating Complete Diets for Beef Cattle, Checking for Nutrient Balance and Estimating Gain.*
40. **Ask**	___	your instructor to show you the basic key strokes necessary to use the program.
41. **Do**	___	Assignment Sheet 7.
42. **Stop**	___	and have your instructor evaluate your work from the Assignment Sheet. After your work has been evaluated, follow your instructor's recommendations.
43. **Do**	___	Assignment Sheet 8.
44. **Ask**	___	your instructor to check your farm before you calculate rations.
45. **Have**	___	Handouts 2-5 available.
46. **Stop**	___	and have your instructor evaluate your work from the Assignment Sheet. After your work has been evaluated, follow your instructor's recommendations.
47. **Study**	___	the Information Sheet, objective 22.
Optional: Visit	___	a poultry operation to see feeding operations.
48. **Study**	___	the Information Sheet, objective 23.

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Optional: Visit	___	a local ranch to investigate the quality of the forage and the grazing method used at the ranch.
49. Do	___	Assignment Sheet 9.
50. Ask	___	your instructor for OSU Extension Facts No. 2568.
51. Stop	___	and have your instructor evaluate your work from the Assignment Sheet. After your work has been evaluated, follow your instructor's recommendations.
52. Do	___	Assignment Sheet 10.
53. Ask	___	your instructor for OSU Extension Facts No. 2584.
54. Stop	___	and have your instructor evaluate your work from the Assignment Sheet. After your work has been evaluated, follow your instructor's recommendations.
55. Ask	___	your instructor for copies of the nutritional deficiency forms collected in Assignment Sheet 1.
56. Do	___	Assignment Sheet 11.
57. Stop	___	and have your instructor evaluate your work from the Assignment Sheet. After your work has been evaluated, follow your instructor's recommendations.
58. Take	___	the posttest provided by your instructor. Have your instructor evaluate your completed test. After your test has been evaluated, follow your instructor's recommendations.

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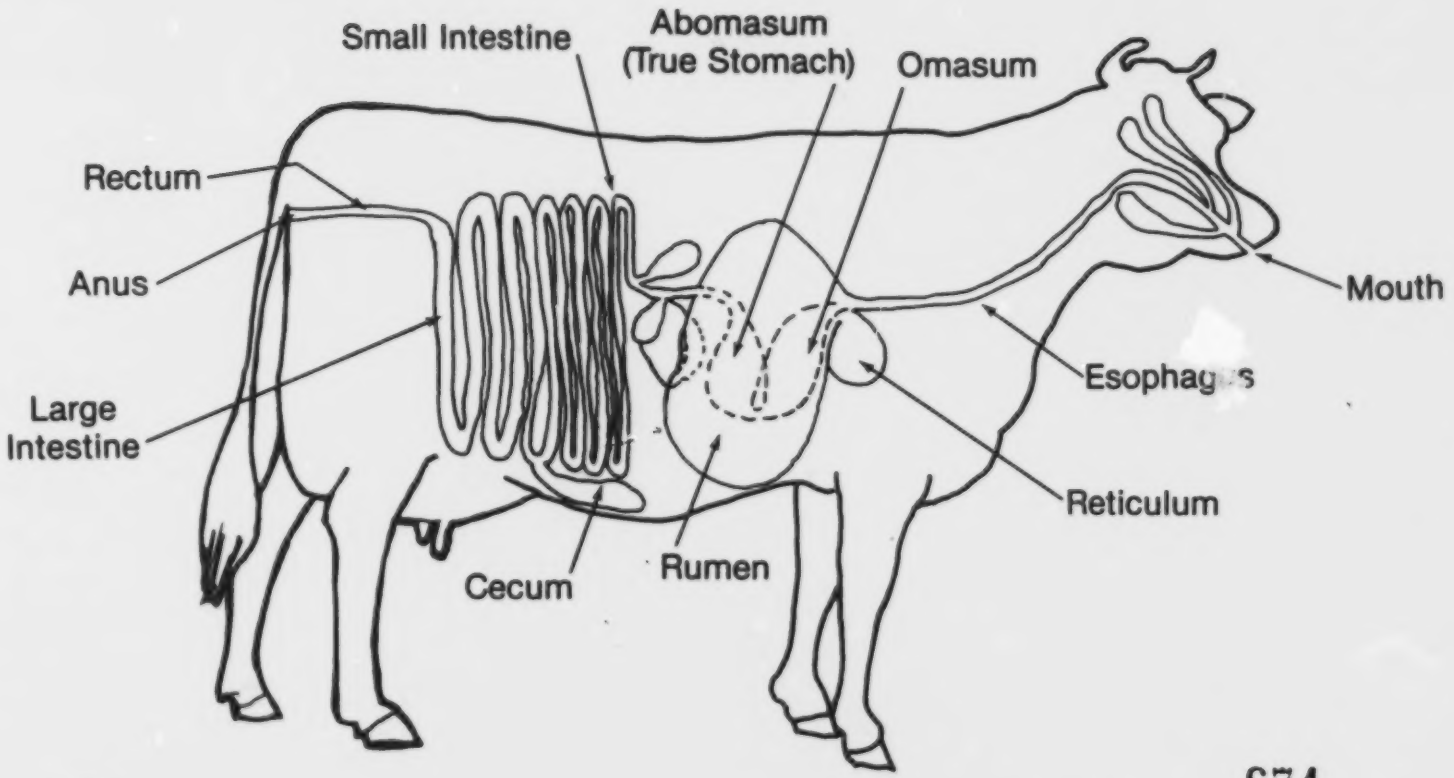
Major Parts of the Digestive System of Ruminants



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INSTRUCTOR'S RESOURCE PACKAGE - Animal Science
TRANSPARENCY MASTER 1 - CIMC - C-3 - 1

Major Parts of the Digestive System of Nonruminants: Nonfunctional Cecum

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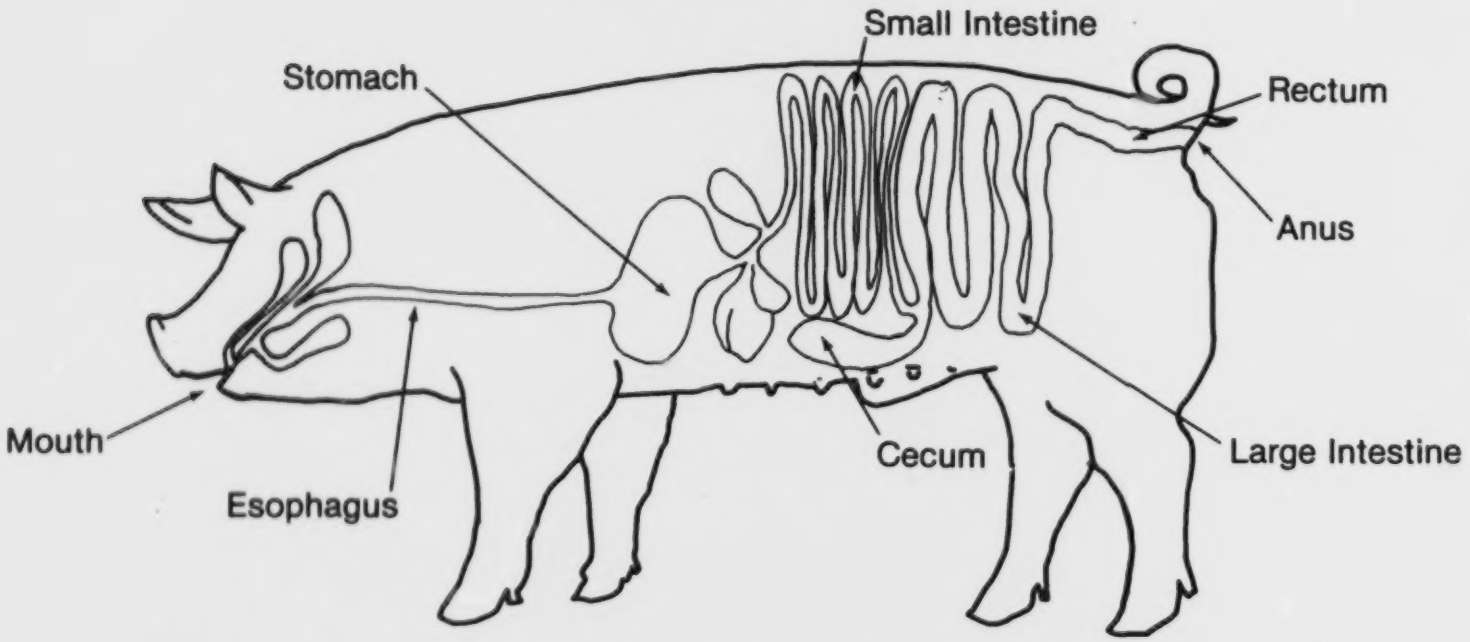
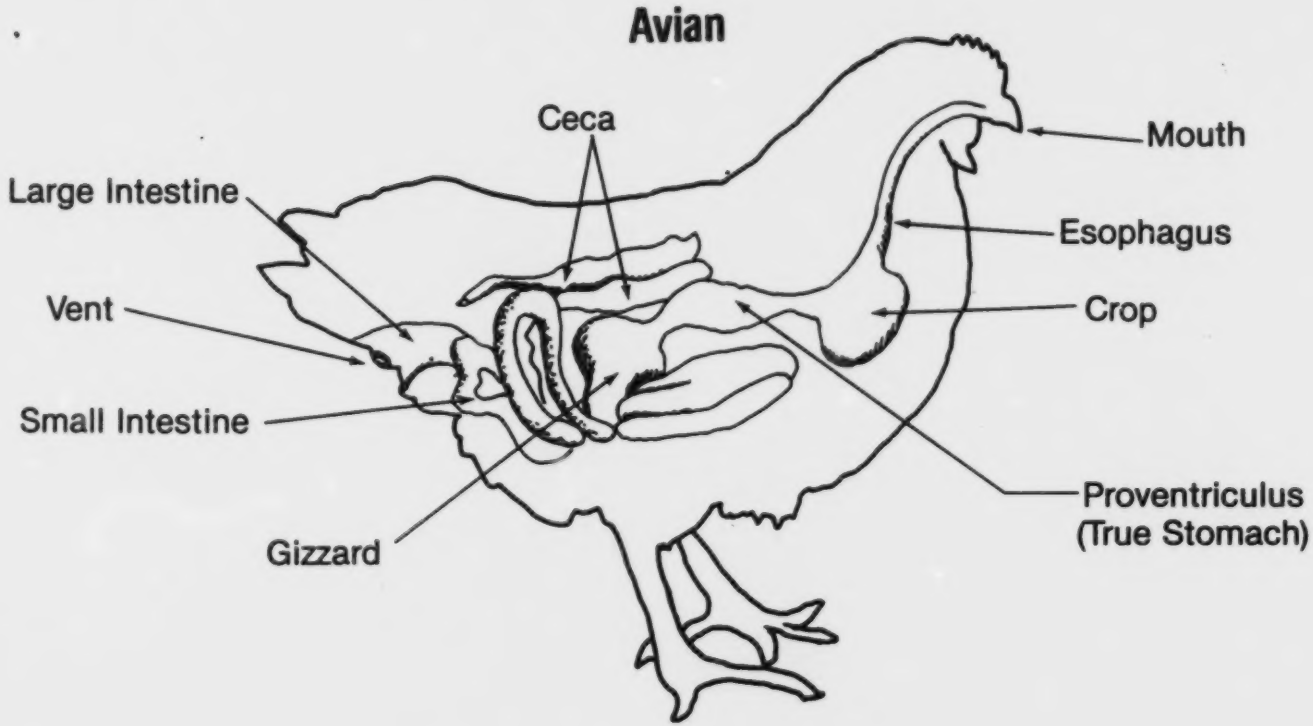
INSTRUCTOR'S RESOURCE PACKAGE - Animal Science
TRANSPARENCY MASTER 2 - CIMC - C-3 - 1

Nonfunctional Cecum



Major Parts of the Digestive System of Nonruminants: Avian



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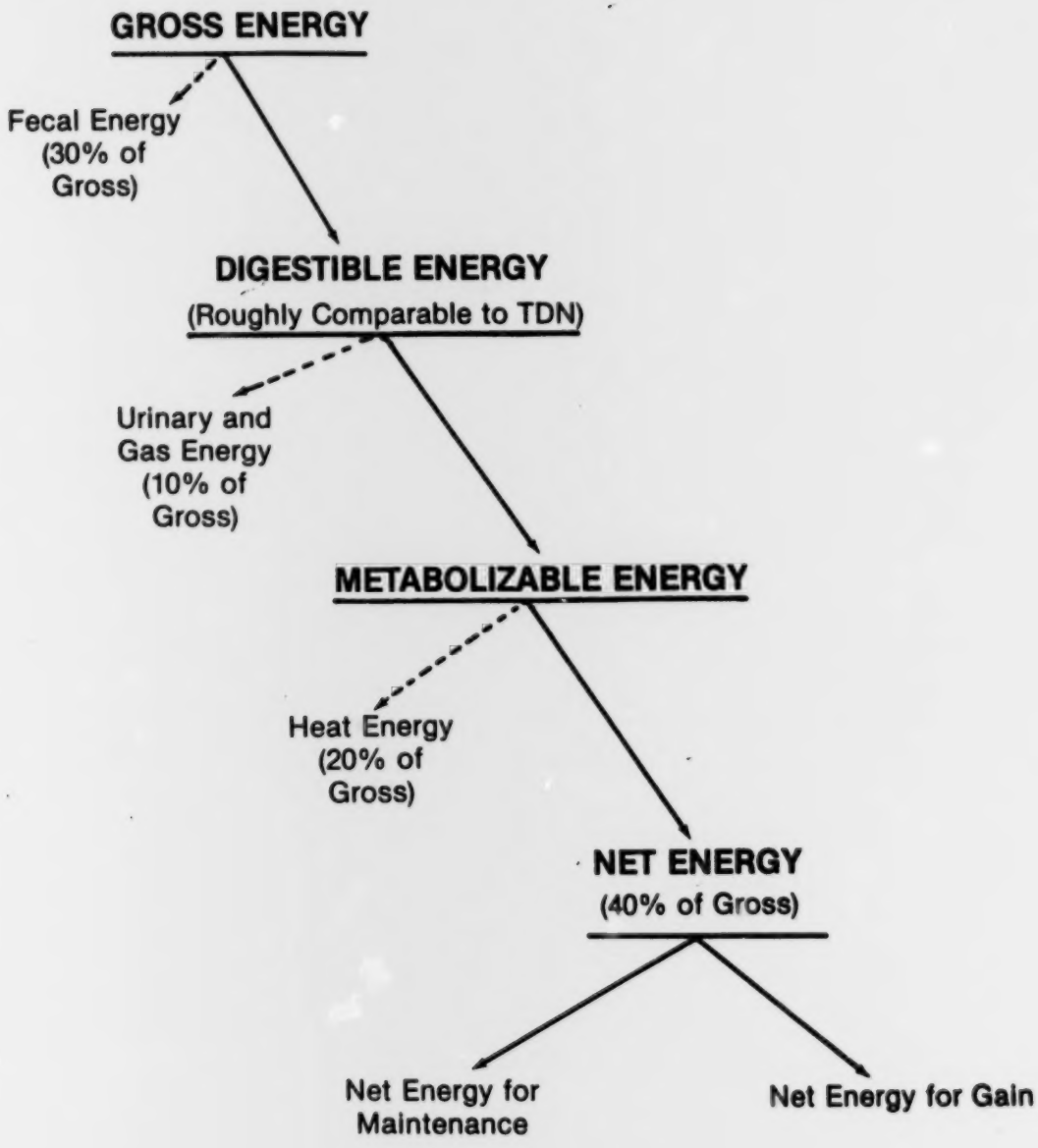
INSTRUCTOR'S RESOURCE PACKAGE - Animal Science
TRANSPARENCY MASTER 3 - CIMC - C-3 - 1

Net Energy System



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WRITTEN TEST	*NUTRITION, FEEDS AND ADDITIVES*	**C-3**

Name _____ Score _____

OBJECTIVE 1

Choose the word or phrase to complete statements about basic principles of animal nutrition and health. Write the letter of the correct answer in the blank.

____ 1. Improper feeding will keep an animal from gaining or maintaining its weight and

A. make an animal aggressive around feed stations
B. cause disease epidemics in the herd or flock
C. weaken an animal's ability to fight diseases
D. provide a means to cull the weakest animals

____ 2. A dairy cow that is producing milk will have the same nutritional needs as

A. a bull of the same size
B. a cow of the same size that isn't producing milk
C. a cow that is three months pregnant
D. none of the above

____ 3. Feed costs make up

A. a relatively minor portion of the cost of maintaining animals
B. a significant portion of the cost of maintaining animals
C. nearly 50% of the cost of maintaining animals
D. nearly 100% of the cost of maintaining animals

____ 4. A comprehensive feeding program should be

A. discussed with your veterinarian or a qualified nutritionist
B. outlined by your local feed supplier
C. determined by your breed association
D. determined by trial and error for your operation

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____ 5. Nutrients include water, protein, minerals, vitamins, and

A. fats and grains
B. fats and carbohydrates
C. carbohydrates and grains
D. grains and hormones

OBJECTIVE 2

Arrange in order the digestive process of ruminants. Write a "1" in the blank before the first step, a "2" in the blank before the second step, and so on.

____ The food moves to the omasum, where water is squeezed from the food.

____ The food moves down the esophagus to the rumen, where it is acted on by millions of microorganisms.

____ The food moves to the small intestine, where the digestible portion is absorbed.

____ The food returns to the rumen/reticulum for further storage and action by microorganisms.

____ The food is taken into the mouth and chewed just long enough to make swallowing possible.

____ The feces is stored in the rectum until it is expelled through the anus.

____ A portion of the food in the form of a bolus is forced from the rumen back into the mouth, where it is rechewed and reswallowed.

____ The food enters the abomasum (true stomach), where it is mixed with digestive juices.

____ The undigested portion of the food moves to the large intestine, where it is formed into feces.

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OBJECTIVE 3

Arrange in order the digestive process of nonruminants. Write a "1" in the blank before the first step, a "2" in the blank before the second step, and so on.

_____ The food moves into the small intestine, where most of the digestible portion is absorbed.

_____ The food moves down the esophagus to the stomach, where it is churned and mixed with digestive juices.

_____ The feces is stored in the rectum until it is expelled through the anus.

_____ The food is taken into the mouth, where it is chewed and mixed with saliva.

_____ The undigested portion of the food moves into the large intestine, where the water is absorbed and the rest is collected to form feces.

_____ The food moves into the cecum.

OBJECTIVE 4

Arrange in order the digestive process of poultry. Write a "1" in the blank before the first step, a "2" in the blank before the second step, and so on.

_____ The food moves through the ceca and the large intestine, where it is formed into feces.

_____ The food moves to the proventriculus (true stomach), where it is mixed with digestive juices.

_____ The food moves to the gizzard, where it is crushed and ground.

_____ The food is taken into the mouth.

_____ The food moves through the small intestine, where nutrients are absorbed.

_____ The food immediately moves down the esophagus to the crop, where it is stored and soaked.

_____ The feces is expelled through the vent.

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OBJECTIVE 5

Choose the word or phrase to complete statements about nutrients, sources, and their actions on animal physiology. Write the letter of the correct answer in the blank.

____ 1. Water regulates body temperature, forms the basis of the body's lubricants, and

A. carries proteins through the body
B. stimulates muscle contractions
C. is responsible for the formation of feces
D. promotes the body's chemical reactions

____ 2. Examples of macro minerals include calcium, phosphorus, sodium, and

A. chloride
B. zinc
C. copper
D. iodine

____ 3. Proteins provide the amino acids necessary to

A. convert carbohydrates into energy
B. build body tissues
C. promote the body's chemical reactions
D. help in tooth and bone formation

____ 4. All of the following are vitamins **EXCEPT**

A. niacin
B. riboflavin
C. selenium
D. biotin

____ 5. Vitamins help to prevent infections and

A. are necessary for normal body functions
B. regulate body temperature
C. provide energy for muscle movement
D. provide the building blocks for amino acids

____ 6. The **major** providers of energy are fats and

A. proteins
B. carbohydrates
C. minerals
D. vitamins

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OBJECTIVE 6

Evaluated on Assignment Sheet 1.

OBJECTIVE 7

Define the categories of feed. Define the following categories of feed:

1. roughage

2. concentrates

3. supplements

4. additives

5. maintenance ration

6. growing ration

7. fattening ration

8. production ration

9. reproduction ration

10. work ration

11. flushing ration

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OBJECTIVE 8

Select true statements about the composition of feeds. Write an "X" in the blank before each correct answer.

____ 1. Creep feed is additional feed for cows in production.

____ 2. Feed additive is a general term for any component added to a ration for a specific purpose.

____ 3. Cereal grains are any of a number of grain concentrates used in rations.

____ 4. Medicated feeds are any type of ration to which medicine has been added to promote growth.

____ 5. Blocks are a supplement that can be consumed as desired.

____ 6. Protein supplements are used to increase a ration's protein level.

____ 7. If a lamb needed supplements in addition to mother's milk, you would give it creep feed.

____ 8. Cereal grains are added to feed to increase the protein and sugar levels.

OBJECTIVE 9

State uses of common additives. State the uses of the following additives:

1. mineral supplements

_____

_____

_____

2. hormones

_____

_____

_____

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3. vitamins

4. urea

5. chemicals

6. antibiotics

OBJECTIVE 10 **Evaluated on Assignment Sheet 2.**

OBJECTIVE 11 **List factors to consider when buying feed.** List seven factors to consider when buying feed.

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OBJECTIVE 12

Evaluated on Assignment Sheet 3.

OBJECTIVE 13

Select true statements about proper feed storage and handling practices. Write an "X" in the blank before each correct answer.

Storage problems:

____ 1. Grains should be treated with a protectant at the time of harvest.

____ 2. Moisture levels should be kept as high as possible to reduce the risk of fire.

____ 3. You should inspect storage facilities for signs of insects and rodents regularly.

____ 4. The majority of the damage caused by rodents is from rodent urine and feces.

____ 5. The best time to apply pesticides is before the insects reproduce.

Requirements for a storage facility:

____ 1. A storage facility should be dry and well organized.

____ 2. You must have a separate shelf for pesticides.

____ 3. Storage facilities should be sanitary and rodent-proof.

____ 4. Storage facilities should have a minimum fire risk.

____ 5. Feeds should not be mixed in a storage facility.

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Factors that determine feed storage area requirements:

____ 1. Climate is not an important factor when determining storage area requirements.

____ 2. The amount of storage area is determined by how close you are to local feed suppliers.

____ 3. How you feed your stock is an important factor in determining storage area requirements.

____ 4. Cattle, sheep, poultry, and swine operations all need about the same amount of storage.

____ 5. The length of the pasture season should be considered when determining total feed storage area.

OBJECTIVE 14

Evaluated on Assignment Sheet 4.

OBJECTIVE 15

Discuss energy values. Answer the following questions.

1. What are five ways that an energy deficiency could affect an animal?

_____

_____

_____

_____

_____

2. Why are carbohydrates the most common form of energy used in rations?

_____

_____

3. Why is TDN a widely used form for measuring energy?

_____

_____

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4. What are three disadvantages of TDN?

5. Why are people starting to use energy values?

6. What units are used to express energy values?

7. What is net energy?

8. What is gross energy?

9. Why is metabolizable energy always going to be less than digestible energy?

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OBJECTIVE 16 | **Choose the word or phrase to complete statements about net-energy.** Write the letter of the correct answer in the blank.

____ 1. The net-energy system determines maintenance levels required by an animal, determines feed intake required for a desired amount of gain, and

A. predicts the amount of gain when feed intake is known
B. determines the minerals and vitamins necessary for growth
C. balances the relationship between protein intake and energy intake
D. indicates the amount of supplements needed by lactating animals

Use the following table to answer questions 2 through 5.

TABLE 1

Daily NE_m and NE_g Requirements for Beef Steers

Body weight (lb)	220	331	441	551	661	772	882	992	1100
NE_m required	2.43	3.30	4.10	4.84	5.55	6.24	6.89	7.52	8.14
Daily gain (lb)	NE_g required								
0.2	0.17	0.23	0.28	0.34	0.39	0.43	0.48	0.52	0.56
0.4	0.34	0.46	0.57	0.68	0.78	0.88	0.97	1.06	1.14
0.7	0.52	0.70	0.87	1.03	1.18	1.33	1.47	1.61	1.74
0.9	0.70	0.95	1.18	1.40	1.60	1.80	1.99	2.17	2.34
1.1	0.89	1.20	1.49	1.77	2.02	2.27	2.51	2.74	2.97
1.3	1.08	1.46	1.81	2.15	2.46	2.76	3.05	3.33	3.60
1.5	1.27	1.73	2.14	2.53	2.90	3.26	3.60	3.93	4.25
1.8	1.47	2.00	2.47	2.93	3.38	3.77	4.17	4.55	4.92
2.0	1.68	2.27	2.82	3.33	3.82	4.29	4.74	5.18	5.60

____ 2. The net energy required for maintenance of a 772 lb steer is

A. 5.55 Mcal
B. 6.24 Mcal
C. 6.89 Mcal
D. 0.39 Mcal

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____ 3. The expected daily gain if you fed a 992 lb steer 2.17 Mcal of energy available for gain would be

A. 0.9 lb
B. 2.17 lb
C. 1.8 lb
D. 7.52 lb

____ 4. An animal that gains 1.8 lb per day when fed 2.93 Mcal of energy available for gain would weigh

A. 1100 lb
B. 220 lb
C. 551 lb
D. 4.84 lb

____ 5. The most energy for maintenance would be required for steers that weigh

A. 661 lb
B. 1100 lb
C. 140 lb
D. 1500 lb

OBJECTIVE 17

Select true statements about balanced rations. Write an "X" in the blank before each correct answer.

____ 1. The Pearson square method for calculating rations is a relatively simple way of determining the proportions of six ingredients.

____ 2. Factors that influence the formula for a balanced ration include palatability, weight and productivity of the animal, and moisture content.

____ 3. Soil analysis determines the quality of some feed ingredients.

____ 4. Computer programs based on the trial-and-error method are available to assist in determining feed compositions.

____ 5. The goal when developing balanced rations is to provide all the nutrients necessary for the animal regardless of cost.

____ 6. With the Pearson square method, protein content must be averaged if three or more feeds are used.

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OBJECTIVE 18 **Evaluated on Assignment Sheet 5.**

OBJECTIVE 19 **Evaluated on Assignment Sheet 6.**

OBJECTIVE 20 **Evaluated on Assignment Sheet 7.**

OBJECTIVE 21 **Evaluated on Assignment Sheet 8.**

OBJECTIVE 22 **Choose the word or phrase to complete statements about poultry feed.** Write the letter of the correct answer in the blank.

____ 1. Poultry operations with small commercial flocks generally use

A. a complete commercial feed
B. feed they have grown
C. custom mixed feed
D. a combination of A, B, and C

____ 2. Poultry feed comes in all the following forms **EXCEPT**

A. mash
B. pellets
C. grit
D. crumbles

____ 3. Factors that affect feed intake include environmental temperature, stress, body size, and

A. daily energy requirement and rate of egg production
B. rate of growth
C. genetics
D. all of the above

____ 4. The primary requirement that affects poultry feed intake is

A. protein
B. calcium
C. water
D. energy

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____ 5. On a daily basis, by weight, poultry drink approximately

A. three times as much as the amount of food
B. half of their body weight
C. twice as much as the amount of food
D. equal amounts of food and water

____ 6. The yellow yolk color is caused by

A. xanthophylls
B. minerals
C. vitamins
D. proteins

____ 7. Grit size depends on the birds'

A. size
B. age
C. breed
D. energy requirement

____ 8. Energy in poultry feed is generally provided by

A. corn
B. proteins
C. vitamins A, D, and E
D. vitamins A, C, and B_{12}

OBJECTIVE 23

Choose the word or phrase to complete statements about pasture requirements and grazing systems. Write the letter of the correct answer in the blank.

____ 1. Forage protein levels are dependent upon the amount of nitrogen in the soil and the

A. age of the pasture
B. maturity of the forage
C. size of the grazing animals
D. minerals in the soil

____ 2. Pasture management techniques to control grazing include

A. removing manure
B. grazing only one type of animal
C. shifting location of salt and water
D. early spring grazing

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____ 3. Supplements are used to promote growth, increase the carrying capacity of forage supplies, and

A. prevent disease or other health problems
B. decrease water intake
C. increase the feeding rate of grazing cattle
D. eliminate external parasites

____ 4. Creep grazing is

A. uninterrupted grazing of a pasture by livestock throughout the grazing season
B. when animals are moved from one pasture to another on a daily basis
C. when two or more pastures are grazed and rested in a planned sequence
D. when high-quality pasture is accessible only to young animals

____ 5. The grazing system in which a large number of livestock graze on a high-quality pasture to take advantage of quality forage is called

A. intensive grazing
B. continuous grazing
C. strip grazing
D. quality grazing

____ 6. Calcium and phosphorus levels in forage

A. increase with maturity
B. decrease with maturity
C. remain steady after reaching maturity
D. are related to the protein level in forage

____ 7. Energy supplements should be given

A. after transporting cattle
B. when cattle look sluggish
C. every other day
D. on a daily basis

May be photocopied for student use.

____ 8. Techniques to maintain the value of a pasture include controlling grazing, mowing and irrigating pastures, controlling weeds, and

A. fertilizing every six months
B. grazing in late fall
C. *grazing two or more kinds of animals*
D. undergrazing on a rotating basis

____ 9. Deficiencies in the forage diet are caused by all of the following **EXCEPT**

A. insufficient forage
B. season shortfalls
C. weed infestation
D. manure accumulation

____ 10. Give protein supplements

A. every day
B. every other day
C. when forage is overgrazed
D. when forage is immature

OBJECTIVE 24 **Evaluated on Assignment Sheet 9.**

OBJECTIVE 25 **Evaluated on Assignment Sheet 10.**

OBJECTIVE 26 **Evaluated on Assignment Sheet 11.**

May be photocopied for student use.

Daily Nutrient Requirements for Growing and Finishing Steer Calves and Yearlings

Weight of animal (lb)	Daily gain (lb)	Minimum dry-matter consumption (lb)	Roughage (%)	Total protein (lb)	Digestible protein (lb)	NE_m (Mcal)	NE_g (Mcal)	ME (Mcal)	TDN (lb)
331	0	6.2	100	0.51	0.29	3.30	0	5.8	3.5
	1.1	8.8	70-80	0.97	0.62	3.30	1.20	9.0	5.5
	1.5	8.6	50-60	1.08	0.73	3.30	1.73	9.6	6.0
	2.0	8.4	25-30	1.19	0.82	3.30	2.27	10.7	6.6
	2.4	8.2	<15	1.28	0.90	3.30	2.84	11.3	6.8
441	0	7.7	100	0.66	0.37	4.10	0	7.0	4.2
	1.1	12.8	80-90	1.26	0.77	4.10	1.49	12.1	7.5
	1.5	12.6	70-80	1.34	0.86	4.10	2.14	13.0	7.9
	2.0	10.8	35-45	1.34	0.88	4.10	2.82	13.3	8.2
	2.4	10.1	<15	1.39	0.95	4.10	3.52	14.1	8.6
551	0	9.7	100	0.77	0.44	4.84	0	8.2	5.1
	1.5	12.8	55-65	1.37	0.86	4.84	2.53	14.4	8.8
	2.0	13.7	45-50	1.52	0.97	4.84	3.33	16.2	9.9
	2.4	13.2	20-25	1.61	1.06	4.84	4.17	17.0	10.4
	2.9	13.2	<15	1.68	1.12	4.84	5.04	18.6	11.5
661	0	10.4	100	0.88	0.51	5.55	0	9.4	5.7
	2.0	17.9	55-65	1.79	1.10	5.55	3.82	19.5	11.9
	2.4	16.8	20-25	1.81	1.15	5.55	4.78	20.4	12.3
	2.9	15.6	<15	1.83	1.19	5.55	5.77	21.6	13.2
	3.1	16.1	<15	1.92	1.26	5.55	6.29	22.5	13.7
772	0	11.7	100	1.01	0.57	6.24	0	10.6	6.4
	2.0	17.6	45-55	1.76	1.08	6.24	4.29	20.8	12.8
	2.4	17.6	20-25	1.83	1.15	6.24	5.36	22.4	13.7
	2.9	17.6	<15	1.92	1.21	6.24	6.48	24.2	15.0
	3.1	18.1	<15	1.98	1.26	6.24	7.06	25.3	15.4
882	0	13.0	100	1.12	0.64	6.89	0	11.8	7.3
	2.2	20.7	45-55	1.92	1.19	6.89	5.33	24.5	15.0
	2.6	18.7	20-25	1.92	1.19	6.89	6.54	25.4	15.4
	2.9	19.0	<15	1.98	1.23	6.89	7.16	26.5	16.1
	3.1	19.8	<15	2.07	1.30	6.89	7.80	28.0	17.0
992	0	14.1	100	1.19	0.68	7.52	0	12.8	7.9
	2.2	22.7	45-55	2.12	1.26	7.52	5.82	26.7	16.3
	2.6	22.5	20-25	2.14	1.28	7.52	7.14	28.6	17.4
	2.9	20.5	015	2.14	1.30	7.52	7.83	29.0	17.6
	3.1	21.6	<15	2.16	1.32	7.52	8.52	30.5	18.5
1102	0	15.4	100	1.32	0.75	8.14	0	13.9	8.4
	2.0	23.1	45-55	2.09	1.23	8.14	5.60	27.1	16.5
	2.4	22.9	20-25	2.12	1.26	8.14	7.01	29.2	17.8
	2.6	21.2	<15	2.12	1.28	8.14	7.73	29.7	18.1
	2.9	22.0	<15	2.14	1.32	8.14	8.47	31.4	19.2

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Guidelines for Feeding Swine

Animal description	% Crude protein*	Amount per day
Sows and gilts, flushing two to three weeks prior to breeding	14%	6 lb to 8 lb
Bred sows and gilts	14%	4 lb to 6 lb
Sows nursing litters	14% to 15%	10 lb to 15 lb
Nursing pigs, two weeks old to weaning	16% to 18% creep ration	Free choice
Pigs, 50 lb to 100 lb	16%	6% of body weight
Pigs, 100 lb to 170 lb	14%	5% of body weight
Pigs, 170 lb to 220 lb, or market weight	13%	4% of body weight
Boars, maintenance	14%	4 lb to 6 lb
Boars, breeding season	16%	6 lb to 8 lb

*Make sure that swine rations contain high-quality protein—a proper balance of amino acids.

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Guidelines for Feeding Sheep (Dry-Lot Feeding)

Animal description	Hay description and amount per day	Concentrate ration amount per day and % of crude protein (CP)
Ewes, maintenance, 130 lb to 150 lb	3 lb alfalfa/grass mixed	—
Ewes, flushing, 2 to 3 weeks prior to breeding, 130 lb to 150 lb	3 lb alfalfa/grass mixed	½ lb to ¾ lb of 12% CP
Ewes, first fifteen weeks of gestation, 130 lb to 150 lb	3.5 lb alfalfa/grass mixed	—
Ewes, last six weeks of gestation, 130 lb to 150 lb	4 lb alfalfa/grass mixed	½ lb of 12% CP
Ewes, first eight weeks of lactation	4.5 lb alfalfa/grass mixed	2 lb of 12% CP
Lambs, birth to eight weeks	—	Free choice, 15% CP
Lambs, eight weeks to 75 lb	—	Free choice, 16% to 18% CP
Lambs, 75 lb to 120 lb, market weight	—	3 lb to 4 lb of 13% to 15% CP
Rams on maintenance	5 lb alfalfa/grass mixed	—
Rams, breeding season	5 lb alfalfa/grass mixed	2 lb of 12% CP

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Guidelines for Feeding Beef-Cattle*

Animal description	Hay description and amount per day	Concentrate ration amount per day and % of crude protein (CP)
Dry, pregnant cows and bred heifers during winter feeding when grazing is not possible	20 lb alfalfa/grass mixed	–
Dry, pregnant cows and bred heifers during winter feeding when dry grazing is possible	–	2 lb of 30% to 40% CP
Cows nursing calves during winter feeding when grazing is not possible	30 lb alfalfa/grass mixed	–
Cows nursing calves during winter feeding when dry grazing is possible	–	3 lb of 30% to 40% CP
Steers and heifers from weaning to finish, first 2 days on feed	free choice high quality hay	
Steers and heifers from weaning to finish, third day to finish	reduce high quality hay as concentrate increases	gradually increase concentrate until the amount levels off at 2.5% of body weight
Young bulls from weaning to fifteen months (total feed 2.5 percent of body weight)	50 percent roughage	50 percent concentrate (CP level depending on rate of gain desired)
Mature bulls during winter feeding	free choice alfalfa hay	4 lb ground or rolled grain and 1 lb of 32% CP in cubes

* As a general rule, sufficient good-quality pasture grasses are all you need for cows (with or without calves), weaned and growing steers and heifers, and bulls. Winter feeding and finishing feeding, however, require special feeding considerations. Free-choice vitamin, mineral, and salt mix should be available on a year-round basis.

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Guidelines for Feeding Dairy-Cattle*

Animal description	Hay description and amount per day	Concentrate ration amount per day and % of crude protein (CP)
Cows in production, not on pasture	free choice of good quality roughage	1 lb of 14% to 16% CP for each 4 lb of milk produced per day
Cows in production, on pasture	–	1 lb of 14% to 16% CP for each 3 lb of milk produced over 30 lb per day
Dry cows	good pasture or free choice alfalfa hay	10 lb of 10% CP in grain mixture
Mature bulls**	1 lb per 100 lb of body weight	1/2 lb per 100 lb of body weight
Heifers on pasture, 4 months old or older	–	1/2 lb of grain concentrate per 100 lb of body weight, not to exceed 4 to 6 lb
Heifers in dry lot, 4 months old or older	free choice of high-quality alfalfa hay	1% of body weight in grain concentrate
Calves, 7 weeks old	–	begin starter ration
Calves, 7 weeks to 4 months	free choice of good-quality alfalfa hay	2 lb to 4 lb of concentrate

* There are a number of accepted rules for feeding dairy cattle. The guidelines are based on per-day amounts and should only serve as general guidelines. Exceptionally productive cows may need more feed.

** Do not feed rations for lactating cows to mature bulls. The additional calcium causes the bones to fuse.

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Water Guidelines

Water should be clean, fresh, and available at all times.

- **beef cattle** – Mature beef cattle will drink an average of 11 gallons of water per day.

  ☑ **NOTE:** Water containing 1% soluble salts may be toxic.

- **dairy cattle** – Lactating cows will drink an average of 12 to 24 gallons per day. Heavy producers may drink as much as 36 gallons.

  ☑ **NOTE:** Cows do not produce more milk from softened water.

- **sheep** – Mature sheep consume an average of 1 gallon of water per day.

  ☑ **NOTE:** Sheep may not drink water if forage has a high moisture content.

- **swine** – Gestation sows will consume 2 to 3 gallons of water per day. Water intake increases to 4 to 5 gallons per day for lactating sows. Finishing pigs will consume 1.5 to 2 gallons per day.

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LAP SHEET

VACCINATION AND DRUGS C-4

Check the blank as you complete each step.

1. **Take** ___ the pretest provided by your instructor. Have your instructor evaluate your completed test. After your test has been evaluated, follow your instructor's recommendations.

2. **Read** ___ the introduction, unit objective, and specific objectives.

3. **Do** ___ the focus assignments.

4. **Stop** ___ and have your instructor evaluate your work from the focus assignment. After your work has been evaluated, follow your instructor's recommendations.

5. **Study** ___ the Information Sheet, objective 1.

Optional: Ask ___ your instructor to show you the vaccination and animal health products kept in stock for your program and to discuss what they are used for and how they are administered.

Optional: Compare ___ human immunity with animal immunity, including human diseases such as measles, smallpox, polio, and tetanus.

Optional: Talk ___ to a veterinarian to discuss drugs in general and the legal and ethical factors that affect their use.

6. **Study** ___ the Information Sheet, objective 2.

7. **Read** ___ the section on types of immunity and types of biological products in *Vaccines – Their Use, Handling, and Care*, OSU Facts Sheet No. 9100, by T. R. Thedford, D.V.M.

Optional: Count ___ and analyze animal health products advertised or discussed in a magazine related to animal production.

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Optional: Ask	___	your instructor if he or she wants to provide Handouts 2 and 3 at this time.
Optional: Ask	___	your instructor to show you catalogs of various veterinary pharmaceutical manufacturers and distributors.
8. Study	___	the Information Sheet, objective 3.
Optional: Ask	___	your instructor to give you Handouts 2 and 3 on recommended vaccination times if you don't already have them.
Optional: Refer	___	to Unit C-2, "Livestock Diseases and Parasites" for information about the diseases.
Optional: Ask	___	your instructor to refer you to a good animal health reference and show you how to use it.
9. Study	___	the Information Sheet, objective 4.
Optional: Study	___	and compare the information on labels of products used in your program or brought from home.
10. Do	___	Assignment Sheet 1.
11. Stop	___	and have your instructor evaluate your work from the Assignment Sheet. After your work has been evaluated, follow your instructor's recommendations.
12. Study	___	the Information Sheet, objective 6.
13. Read	___	the section on how to handle and care for vaccines in *Vaccines – Their Use, Handling, and Care.* OSU Facts Sheet No. 9100.
Optional: Compare	___	the short-term and long-term costs of using products that are too old or that have lost their effectiveness because of improper handling.
14. Study	___	the Information Sheet, objective 7.

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Optional: Research	___	epinephrine and learn where it comes from, what it does, and how it works.
15. Study	___	the Information Sheet, objective 8.
Optional: Read	___	and compare dosage levels and mixing instructions for several similar and dissimilar products.
16. Do	___	Assignment Sheet 2.
17. Stop	___	and have your instructor evaluate your work from the Assignment Sheet. After your work has been evaluated, follow your instructor's recommendations.
18. Study	___	the Information Sheet, objectives 10 and 11.
Optional: Ask	___	your instructor to display equipment used to administer livestock medications and monitor health care and explain and demonstrate their use.
Optional: Talk	___	to a local supplier to show various types and sizes of equipment and discuss their use.
19. Ask	___	your instructor to demonstrate the guidelines and procedures in Job Sheets 1-4. Use the Job Sheets to follow along. Pay careful attention to any guidelines, cautions, and warnings.
20. Practice	___	the procedures demonstrated by your instructor. Use the Job Sheets as a guide.
21. Stop	___	and have your instructor evaluate your work from the Job Sheets. After your work has been evaluated, follow your instructor's recommendations.
22. Study	___	the Information Sheet, objective 16.
Optional: Watch	___	a video on vaccination and/or injections.
23. Study	___	the Information Sheet, objective 17.

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Optional: Ask	___	your instructor to dismantle several types of syringes and allow you to examine, identify, and handle the parts.
24. Ask	___	your instructor to show you Transparency 1.
25. Study	___	the Information Sheet, objective 18.
Optional: Ask	___	your instructor to demonstrate how to sterilize and handle a syringe.
26. Study	___	the Information Sheet, objectives 19 and 20.
27. Ask	___	your instructor to show you Transparency Masters 2-10.
Optional: Ask	___	your instructor to demonstrate on live animals when possible.
28. Ask	___	your instructor to demonstrate the guidelines and procedures in Job Sheets 5-7. Use the Job Sheets to follow along. Pay careful attention to any guidelines, cautions, and warnings.
29. Practice	___	the procedures demonstrated by your instructor. Use the Job Sheets as a guide.
30. Stop	___	and have your instructor evaluate your work from the Job Sheets. After your work has been evaluated, follow your instructor's recommendations.
31. Study	___	the Information Sheet, objective 24.
Optional: Talk	___	to a livestock producer to discuss the use of hormones.
32. Study	___	the Information Sheet, objective 25.
Optional: Invite	___	a consumer advocate, a veterinarian, and a livestock producer to discuss the legal and ethical aspects of using growth hormones.
Optional: Make	___	a graph with the information in Table 3.

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Optional: Use	___	the *Reader's Guide to Periodic Literature* to research recent attitudes and findings on the use of hormones.
33. Study	___	the Information Sheet, objective 26.
Optional: Ask	___	your instructor to provide several pellets for you to examine and handle.
34. Study	___	the Information Sheet, objective 27.
Optional: Ask	___	your instructor to discuss the types of hormones used in your region.
Optional: Ask	___	your instructor to create gain and efficiency problems to help you understand how using hormones can be cost effective.
35. Study	___	the Information Sheet, objective 28.
Optional: Research	___	genetic improvements that improve gain.
Optional: Examine	___	your current feed programs and determine how they could be adjusted to improve the quality, digestibility, and palatability.
36. Ask	___	your instructor to demonstrate the guidelines and procedures in Job Sheet 8. Use the Job Sheet to follow along. Pay careful attention to any guidelines, cautions, and warnings.
37. Practice	___	the procedures demonstrated by your instructor. Use the Job Sheet as a guide.
38. Stop	___	and have your instructor evaluate your work from the Job Sheet. After your work has been evaluated, follow your instructor's recommendations.
39. Do	___	Assignment Sheet 3.
40. Stop	___	and have your instructor evaluate your work from the Assignment Sheet. After your work has been evaluated, follow your instructor's recommendations.

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41. Take

___ the posttest provided by your instructor. Have your instructor evaluate your completed test. After your test has been evaluated, follow your instructor's recommendations.

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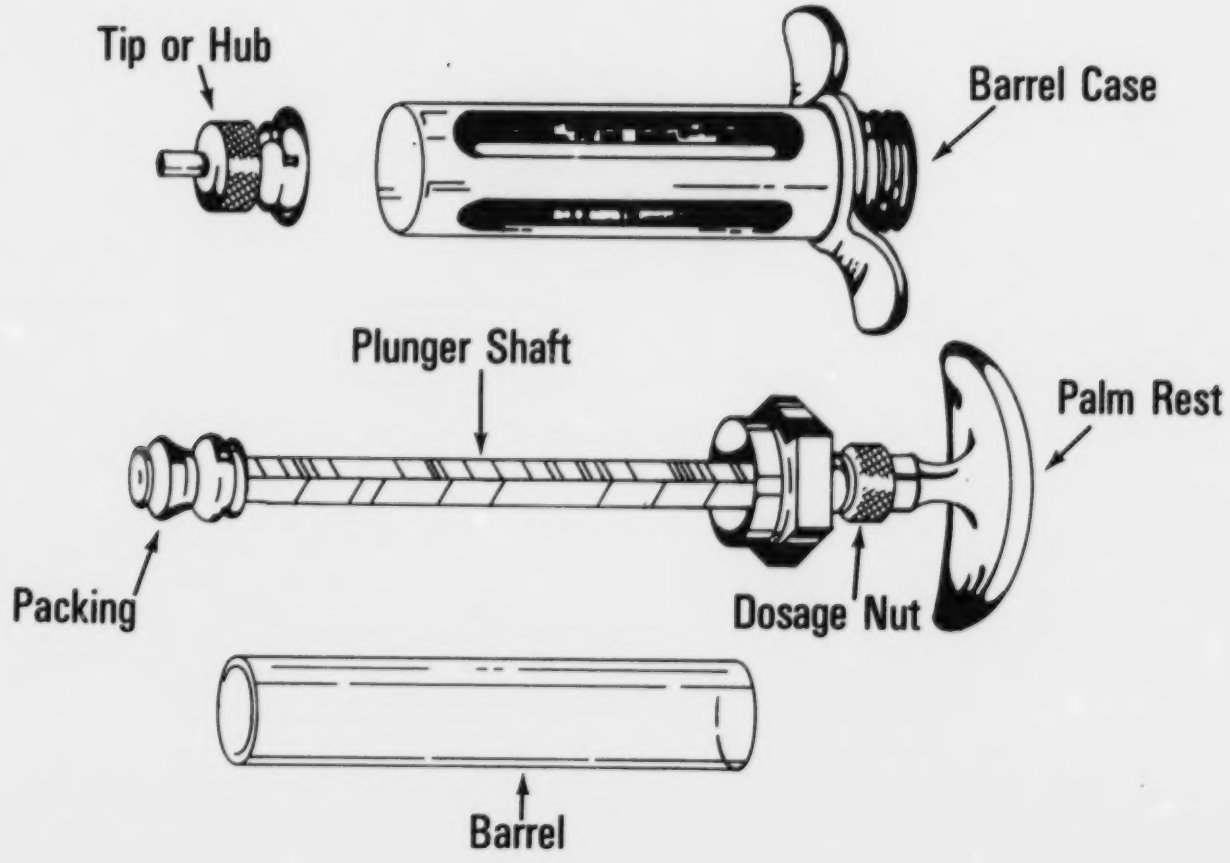
Parts of a Syringe



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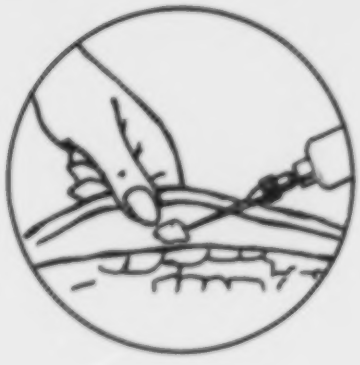
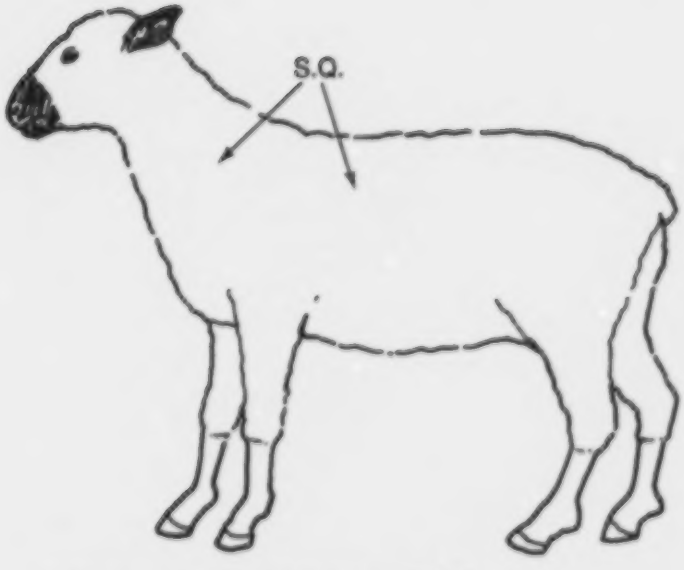
INSTRUCTOR'S RESOURCE PACKAGE - Animal Science
TRANSPARENCY MASTER 1 - CIMC - C-4 - 1

Subcutaneous (Sub Q) Injections





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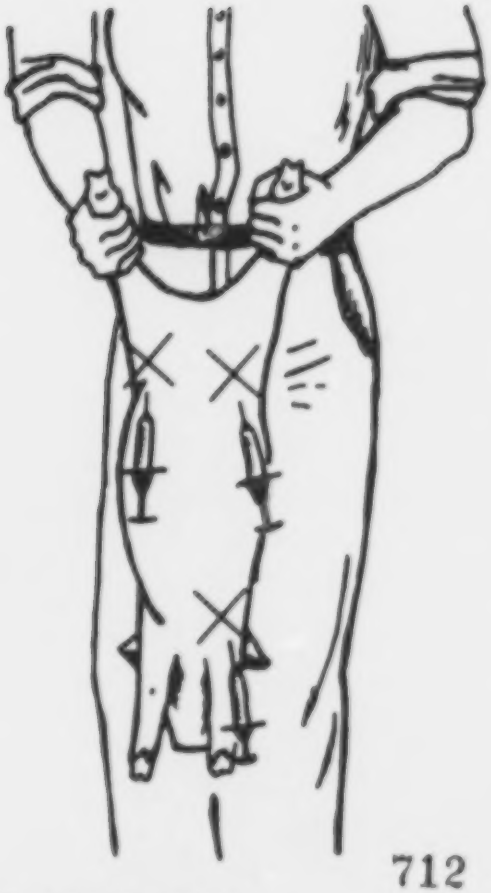
Subcutaneous (Sub Q) Injections
(Continued)



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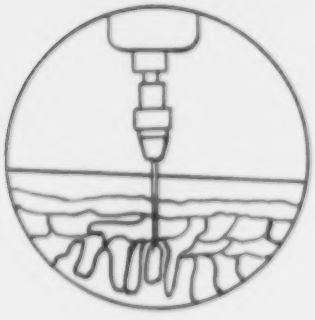
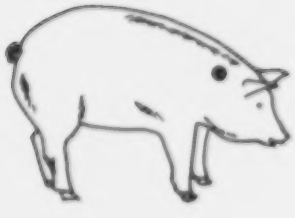
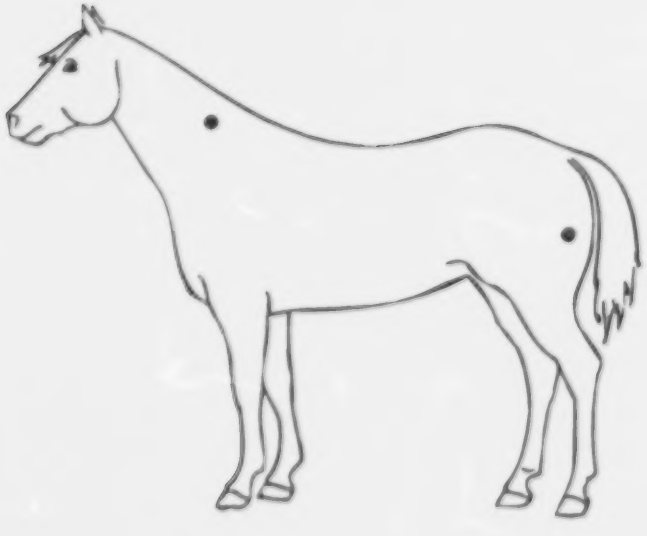
Intramuscular (IM) Injections







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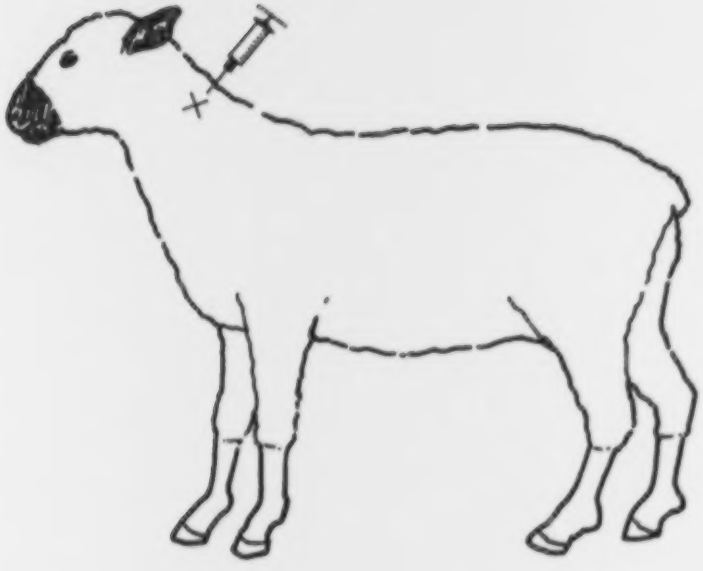
Intramuscular (IM) Injections
(Continued)



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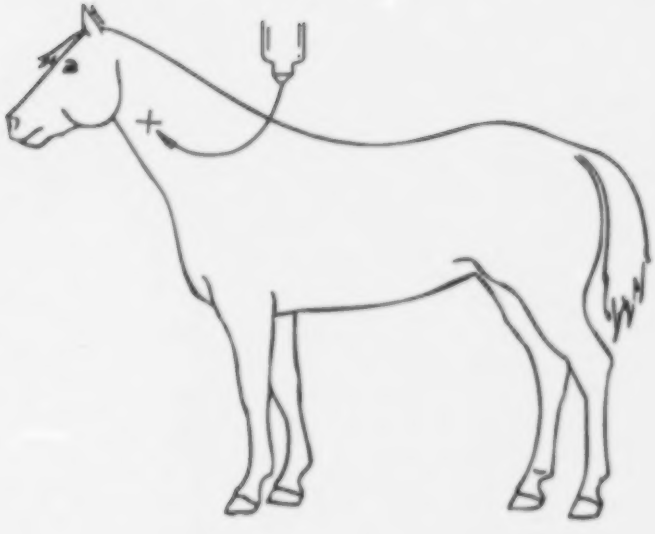
Intravenous (IV) Injections



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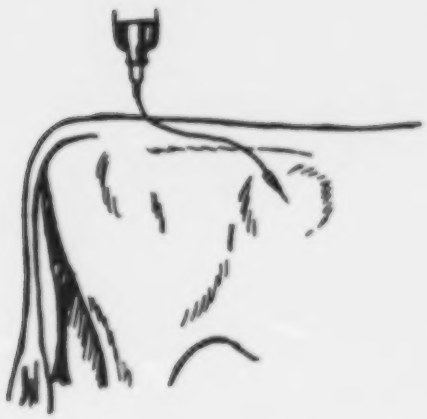
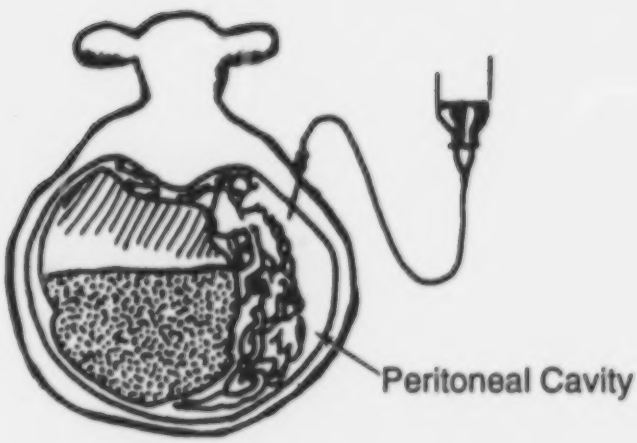
Intraperitoneal (IP) Injection





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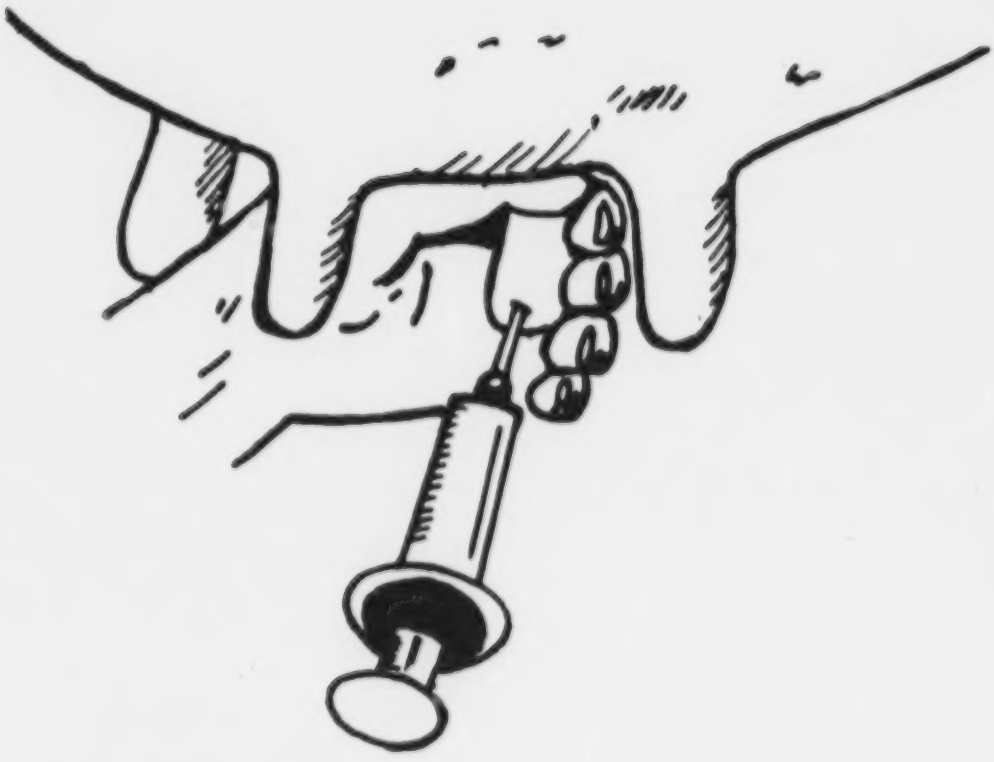
Infusion Intramammary (IMM)



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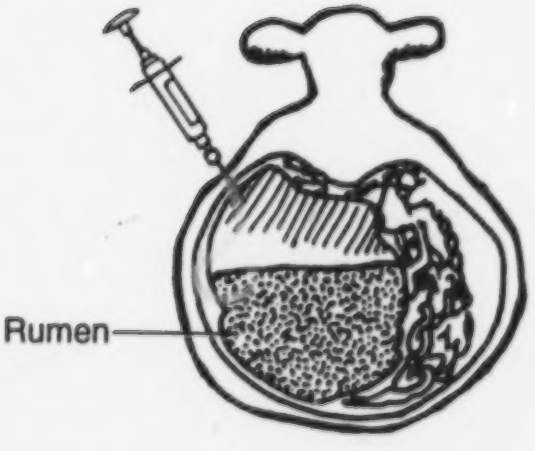
Intraruminal (IR) Injection



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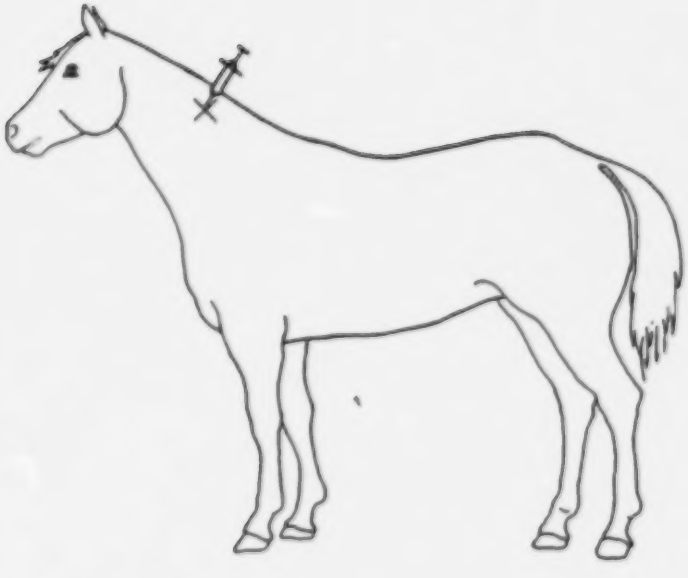
Intradermal (ID) Injection



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WRITTEN TEST

VACCINATION AND DRUGS C-4

Name _____ Score _____

OBJECTIVE 1

Choose the word or phrase to complete statements about immunity, vaccination, and drugs. Write the letter before the correct phrase in the blank.

____ 1. Before any drug can be administered to livestock or poultry, the FDA must

A. review testing by the developer
B. license the developer
C. test and approve the drug
D. approve drug testing requirements

____ 2. When a disease pathogen invades an animal, the body reacts in two ways; the phagocytes in the blood stream engulf or attack and kill the bacteria or virus and

A. the body mutates existing antibodies to fight the specific pathogen
B. the pathogen waste is immediately flushed from the body
C. body systems adapt to the threat of the pathogen for protection from later invasion
D. the body develops antibodies against the specific organism to fight the disease

____ 3. Passive immunity is a type of

A. natural immunity that lasts a long time
B. natural immunity that develops quickly
C. acquired immunity that is temporary
D. acquired immunity that is inherited

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____ 4. Natural immunity

A. can be active or passive
B. is inherited resistance to disease
C. is acquired from the mother
D. takes about a month to develop

____ 5. Active immunity

A. is inherited resistance to disease
B. is temporary
C. develops quickly
D. means having antibodies in the blood

____ 6. When a vaccine is injected into an animal, the animal's body

A. builds up antibodies against the organism
B. builds up pathogens against the organism
C. develops a natural immunity to the organism
D. develops antiserums

____ 7. A modified live virus vaccine is made

A. by infecting an animal with a specific virus which is harvested and subjected to killing agents
B. from a virus that has been passed through another host
C. by growing a live culture of the virus or bacteria
D. from a bacteria that has been passed through another host

____ 8. If a disease is caused by a streptococcus bacteria, the drug MOST LIKELY to be used to vaccinate against the disease is a

A. bacterin
B. modified live virus
C. live virus
D. killed virus

____ 9. A vaccine that produces immunity against two or more diseases is called

A. polyvalent
B. multivalent
C. bivalent
D. equivalent

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____ 10. Drugs can do all the following **EXCEPT**

A. aid the body's natural defenses
B. produce desirable changes in the body
C. produce negative reactions
D. replace natural immunities

____ 11. Distribution and administration of veterinary drugs are restricted by

A. drug company policies
B. the federal government
C. accepted herd management policies
D. professional veterinary guidelines

____ 12. ELUD is

A. the process in which drugs are combined and tested
B. a guideline useful in remembering drug handling and storage policies
C. the branch of the FDA responsible for overseeing veterinary drugs
D. the illegal use of veterinary-prescribed drugs by stock managers at their own initiative

____ 13. Failure to meet withdrawal periods for meat animals

A. violates the law
B. decreases meat quality
C. reduces sale prices
D. reduces levels of resistance

____ 14. As a livestock producer, you will have the right to choose the drugs which will result in the highest production rate and efficiency, while protecting

A. the animal against all potential antigens
B. the consumer and complying with FDA regulations
C. the health of animals the herd may come into contact with
D. the rights of other herd managers

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____ 15. Drugs are derived from all the following sources **EXCEPT**

A. manufactured animal glands and tissues
B. cultured from residues
C. synthesized from combinations of chemicals
D. grown from living organisms

OBJECTIVE 2

Select from a list true statements about types of animal health products. Write an "X" in the blank before each true statement.

____ 1. Anticoagulants are agents that inhibit the clotting of blood.

____ 2. Sulfa drugs are man-made chemicals that interfere with nutrients required for the growth and reproduction of bacteria.

____ 3. A pharmaceutical is a type of antibiotic.

____ 4. Broad-range antibiotics will protect against a number of different pathogens.

____ 5. Agents that promote the clotting of blood are called anticoagulants.

____ 6. Antibiotics are used to increase growth because they increase food and water intake and may improve digestion and absorption of some nutrients.

____ 7. Antiseptics are drugs used to produce insensibility to pain.

____ 8. Corticosteroids are hormones obtained from the adrenal gland.

____ 9. Antihistamines reduce inflammation.

____ 10. Sulfonamides attack viruses.

____ 11. Coagulants promote blood clotting.

____ 12. Anesthetics reduce sensibility to pain.

____ 13. Antiseptics are used around a wound or at the site of a surgical procedure or injection to clean and disinfect the area.

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____ 14. Narrow-range antibiotics will work only for a short period of time.

____ 15. Pharmaceuticals are only useful before the onset of disease or infection.

____ 16. Biologicals are derived from a living source.

____ 17. Parasiticides are never administered internally.

____ 18. Vitamins and minerals can be used therapeutically to prevent or treat symptoms caused by disease or stress.

____ 19. Parasiticides can be applied to the animal or to the surroundings.

____ 20. Hormones are used therapeutically to correct malfunctions or to stimulate normal functions.

____ 21. Antibiotics are normally distributed through dipping or through back scratchers.

____ 22. Powders or dusts should not be mixed with water.

____ 23. Parasiticides can be applied directly to the hair and skin.

____ 24. Sprays are concentrated liquid pesticides mixed with water and applied under pressure through nozzles that break the liquid into tiny droplets.

____ 25. Insecticides can be applied with bags saturated with an oil-base mixture and suspended between two posts.

____ 26. Implants are most commonly used in poultry, but are rarely used in beef and sheep production.

____ 27. The insecticide in ear tags can be spread by animal movement and contact with other animals.

____ 28. Intranasal vaccines are commonly used on calves and young swine.

____ 29. Intraocular vaccines are placed directly into the eyes.

____ 30. Implants are pellets containing growth hormones or other medications.

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OBJECTIVE 3

Choose the word or phrase to complete statements about standard medications. Write the letter before the correct phrase in the blank.

____ 1. Recommended vaccinations include all of the following **EXCEPT**

A. diarrhea
B. vibriosis
C. red nose/pink eye
D. anthrax

____ 2. In addition to recommended vaccinations, you should vaccinate against diseases prevalent in your area and

A. diseases any of your animals experienced during the last five years
B. any diseases against which vaccinations have recently been developed
C. specific diseases your animals have been exposed to
D. any diseases experienced upwind or upstream of your herd

____ 3. Herd vaccination should include

A. all animals
B. only healthy animals
C. only animals which have been weakened by illness or accident
D. animals born during the past twelve months

____ 4. If one animal in your herd contracts a disease, before vaccinating the rest of the herd,

A. grow cultures from each of the animals and test for signs of the illness
B. dispose of the affected animal
C. consult the FDA for recent updates and procedures
D. contact your veterinarian

____ 5. Vaccines against enterotoxemia, calf scours, and enteric colibacillosis are administered to

A. the dam and passed to the offspring
B. immediately after birth
C. in a single injection
D. all species

May be photocopied for student use.

____ 6. A steady low level of antibiotics added to daily feed of cattle receiving low-energy rations will cause the cattle to

A. become intolerant to some medications
B. gain weight more rapidly and efficiently
C. bear larger calves
D. produce higher-grade meat and milk

____ 7. Organisms that produce toxins and waste products are affected by

A. antibiotics
B. parasiticides
C. insecticides
D. vaccines

____ 8. Before using any parasiticides or insecticides, you should

A. obtain the required permits
B. be sure of the diagnosis and consult the FDA
C. consult a veterinarian and get a prescription
D. confirm the diagnosis and consult a veterinarian

____ 9. High levels of antibiotics are added to feeds to prevent and treat stress associated with

A. transportation and adjustment to a new environment
B. high summer temperatures
C. reproduction and mating
D. polling, vaccination, castration, and other procedures

____ 10. Antibiotics can be combined with other antibiotics or with

A. parasiticides
B. insecticides
C. vaccinations
D. hormones

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____ 11. With selective drugs, such as some antibiotics and sulfa drugs, a drug that is

A. effective in one breed may not kill the same disease in another breed
B. effective against one disease will be effective against a similar disease
C. effective in one species may not kill the same disease in another species
D. safe for one species will be safe for another species

____ 12. Antibiotics have withdrawal periods before

A. slaughter
B. sale
C. mating
D. using other medication

____ 13. External parasiticides and insecticides include the following controls

A. chemical, biological, mechanical, and hormonal
B. chemical, biological, hormonal, and environmental
C. biological, chemical, mechanical, and environmental
D. mechanical, hormonal, biological, and environmental

____ 14. High levels of neomycin are used to treat

A. diarrhea in cattle, sheep, and poultry
B. respiratory disease in poultry
C. foot rot
D. liver abscesses

____ 15. Penicillin is used to treat respiratory disease in

A. cattle and sheep
B. cattle, sheep, and swine
C. sheep, swine, and poultry
D. all livestock

May be photocopied for student use.

OBJECTIVE 4

Select from a list label requirements for animal health care products. Write an "X" in the blank before each label requirement.

____ 1. statement of gross contents

____ 2. name and address of manufacturer

____ 3. statement of net contents

____ 4. FDA permit number

____ 5. statement of active and inert ingredients present

____ 6. equipment use instructions

____ 7. full and complete directions for use

____ 8. registration number

____ 9. state sales permit number

____ 10. antidote statement, when applicable

____ 11. precautionary information adequate for safe use

____ 12. tables or information for calculating mixes or determining dosage level

____ 13. restricted use statements

____ 14. phone number of manufacturer

____ 15. phone number of the national poison control center

OBJECTIVE 5

Evaluated on Assignment Sheet 1.

OBJECTIVE 6

Complete guidelines for using animal health products. Write the word or words that complete the guidelines in the blanks.

1. Buy only from _____ manufacturers and distributors.

2. Reject any product that may have lost its

_____.

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3. Carefully read and follow faithfully the complete instructions for product use and the

   _____ information.

4. Carefully read all information for calculating mixes and determining _____ _____.

5. When the label recommends, wear

   _____ articles.

6. Adhere to _____ range requirements.

7. Get an accurate _____ before using drugs to treat a diseased animal.

8. Use good _____ procedures when administering drugs.

9. Keep medications away from children and _____.

10. Get rid of a product that has passed its

    _____ _____.

11. Always _____ a needle before disposing of it.

12. Dispose of empty containers _____

    _____.

OBJECTIVE 7

Discuss anaphylaxis. Write your answers in the space provided.

1. What is anaphylactic shock?

   _____

   _____

   _____

   _____

May be photocopied for student use.

2. What two types of reactions can occur?

3. Why is the number of cases of anaphylaxis increasing?

4. How are fixed antibodies and histamine involved in an anaphylactic reaction?

5. What are five symptoms of anaphylactic shock?

6. How soon after the injection can anaphylaxis occur?

7. What is the recommended treatment?

May be photocopied for student use.

OBJECTIVE 8

Select from a list factors to consider when calculating mixes or determining dosage levels for animal health products. Write an "X" in the blank before each factor.

____ 1. vaccination schedule

____ 2. unit of measure to be used for the size of the animal being treated

____ 3. breed of animal being treated

____ 4. size and gauge of needles

____ 5. types of substances being mixed

____ 6. type of injection

____ 7. species of animal being treated

____ 8. age, sex, and state of the animal being treated

____ 9. injection sites

____ 10. method of applying the product

OBJECTIVE 9

Evaluated on Assignment Sheet 2.

OBJECTIVE 10

Match methods of administering medicine to their descriptions. Write the letter of the correct answer in the blank.

A. anal or rectal	G. interdermal	M. oral
B. dipping	H. intestinal	N. rumen inoculation
C. drenching	I. intradermal	O. sublingual
D. esophageal	J. intramammary	P. topical
E. ingestion	K. intrauterine	Q. tubing
F. injectable	L. nasal	R. using a dose syringe

____ 1. adding medicines to the feed or water

____ 2. applied to the skin or the mucous membranes of the eyes, ears, or nasal passages

____ 3. forcing medicine down the throats of animals and poultry using a syringe with a long pipe or nozzle

May be photocopied for student use.

A. anal or rectal
B. dipping
C. drenching
D. esophageal
E. ingestion
F. injectable
G. interdermal
H. intestinal
I. intradermal
J. intramammary
K. intrauterine
L. nasal
M. oral
N. rumen inoculation
O. sublingual
P. topical
Q. tubing
R. using a dose syringe

____ 4. given by mouth

____ 5. inserting a device into the animal's esophagus or stomach

____ 6. introduced directly into uterus

____ 7. introduced into the nose

____ 8. introduced into the rectum

____ 9. introduced into the teat to treat mastitis

____ 10. placed directly into the animal's body with a needle and syringe

____ 11. pumping or pouring the rumen liquid from a healthy animal through a drenching tube into the rumen of a sick animal

____ 12. placing the liquid in the back of the animal's mouth

OBJECTIVE 11

Match equipment used to administer livestock medications and monitor health care to their descriptions. Write the letter of the correct answer in the blank.

A. balling gun
B. bolus gun
C. drench gun
D. ear tagger
E. implant gun
F. IV equipment
G. speculum tube
H. suppository
I. syphon
J. syringe
K. trocar and cannula
L. vaccination gun

____ 1. used to deposit growth stimulant pellets in the ear

____ 2. device used to relieve bloat in cattle and sheep

____ 3. used to administer liquid medications orally; measures doses in cubic centimeters or ounces

May be photocopied for student use.

A. balling gun
B. bolus gun
C. drench gun
D. ear tagger
E. implant gun
F. IV equipment
G. speculum tube
H. suppository
I. syphon
J. syringe
K. trocar and cannula
L. vaccination gun

____ 4. twenty-inch metal tube used with a rubber tube to relieve cattle of bloat

____ 5. used to administer pills, capsules, or boluses orally

____ 6. used with a needle to administer liquid injectables

____ 7. used to administer medicine continually or intermittently over a period of time

OBJECTIVE 12 **Evaluated on Job Sheet 1.**

OBJECTIVE 13 **Evaluated on Job Sheet 2.**

OBJECTIVE 14 **Evaluated on Job Sheet 3.**

OBJECTIVE 15 **Evaluated on Job Sheet 4.**

OBJECTIVE 16 **Select from a list guidelines for giving injections.** Write an "X" in the blank before each correct guideline.

____ 1. Administer vaccine only in a syringe calibrated in cc's.

____ 2. Allow one hour to observe negative reactions from the vaccine.

____ 3. Antibiotics should be administered for a minimum of three days to insure their effectiveness.

____ 4. Do not vaccinate meat-producing animals within 14 days of slaughter.

____ 5. Change needles for each animal when anaplasmosis may be a problem in the herd.

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____ 6. Check that the needle is not in an artery before injecting the drug.

____ 7. Change needles for each animal when anaphylactic shock is a problem in the herd.

____ 8. Do not use alcohol to clean an injection site when using a modified live virus vaccine.

____ 9. Do not expose live biologicals to sunlight.

____ 10. Fluids to be injected should be at body temperature or lower; never higher.

____ 11. Never stab or inject in primal cuts.

____ 12. Give repeated injections in the same place to keep inflammation localized.

____ 13. Gently massage the injection site to hasten absorption and prevent leakage from the site.

____ 14. Inject by the proper route and use the proper method.

____ 15. Inject the drug quickly and remove the needle slowly.

____ 16. Refrigerate vaccine bottles before, during, and after use.

____ 17. Make sure that the animal is healthy when vaccinated.

____ 18. Do not give injections in the shoulder or neck muscles.

____ 19. Antibiotics should be administered for a minimum of five days to insure their effectiveness.

____ 20. Rotate sites when giving a series of injections to prevent soreness and local inflammation.

____ 21. Use more than one injection site if your are injecting more than 10 ml of medication, especially on smaller animals.

____ 22. Use only the dose directed; do not overdose or underdose.

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____ 23. Do not use alcohol to clean an injection site when using a bacterial vaccinate.

____ 24. Refrigerate antibiotics before use.

____ 25. Do not expose live biologicals to temperatures below 70° F.

____ 26. To see if you have put the needle in a vein, pull back slightly on the plunger; if blood appears, use another site.

____ 27. Inject biologicals at room temperature.

____ 28. Administer antibiotics to an animal with an empty stomach.

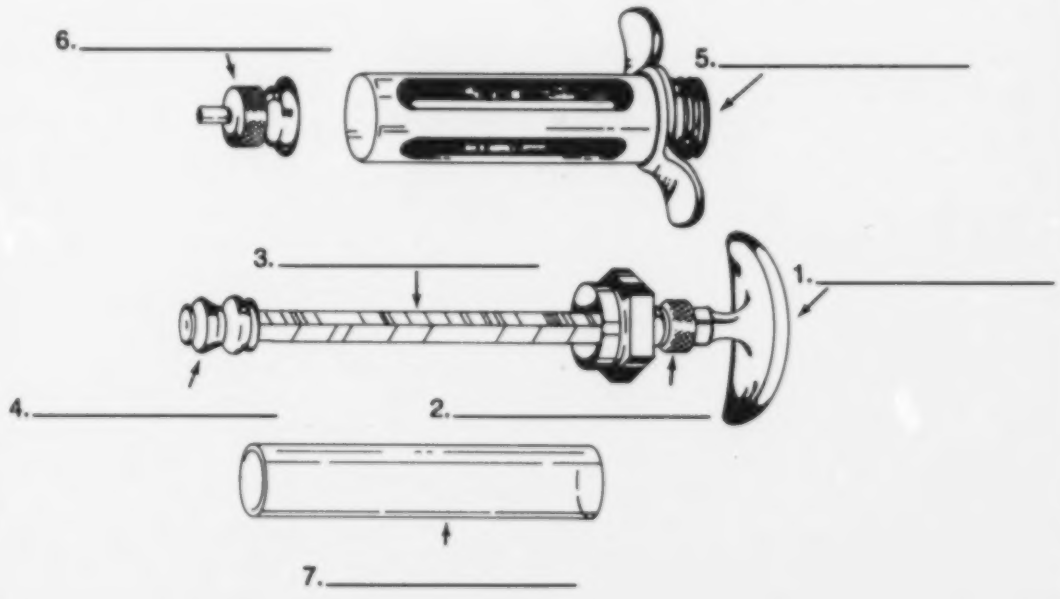
____ 29. Use a syringe that is clean and in good working order.

____ 30. Give injections in loin and back muscles.

May be photocopied for student use.

OBJECTIVE 17 | **Label the parts of a syringe.** Write the name of the part in the blank.

Parts of a Syringe



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OBJECTIVE 18

Discuss guidelines for syringe use and care. Write your answers in the space provided.

1. Describe the four steps in sterilizing a nondisposable syringe by boiling.

_____

_____

_____

_____

2. Describe how to sterilize a syringe with alcohol. Include the type of alcohol solution you should use.

_____

_____

_____

3. How should you handle a sterilized syringe to avoid contamination?

_____

4. When should you sharpen or discard needles?

_____

May be photocopied for student use.

OBJECTIVE 19

Match types of injections to their descriptions. Write the letter of the correct answer in the blank.

A. infusion intramammary (IMM)
B. interdermal injection (ID)
C. intradermal injection (ID)
D. intramuscular injection (IM)
E. intraocular injection (IO) in poultry
F. intraperitoneal injection (IP) in cattle
G. intraruminal injection (IR)
H. intravenous (IV) injection in cattle
I. subcutaneous injection (Sub Q)
H. submuscular injection (Sub M)
K. wing-web injection

____ 1. made deeply into large muscles with a needle at least 3/4 inch long

____ 2. vaccine is injected into the skin on the underside of the wing web at the elbow using a grooved, double needle instrument

____ 3. made into the right flank at a point in the center of a triangle formed by the loin, the last rib, and a line from the top of the last rib to the hip bone

____ 4. made through the left flank with a 14-gauge, 3-inch needle

____ 5. made in any area where the skin fits loosely, such as the neck, chest wall, or flank; deposit the dosage under raised skin, and then massage the area to aid distribution

____ 6. made directly into the jugular vein with a 14- or 16-gauge, 1½- to 2-inch needle, with the point toward the animal's heart

____ 7. made into the skin with a 20- to 26-gauge needle

____ 8. made with a cannula directly into the teat canal; disinfect the teat and depress it to open the sphincter muscle

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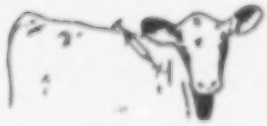
OBJECTIVE 20

Identify injection sites. Write the letter of the correct answer in the blank. Answers may be used more than once and some items may have more than one answer.

A. subcutaneous
B. intramuscular
C. intravenous
D. intraperitoneal
E. intramammary
F. intradermal
G. intraruminal

1._____

2._____



3._____

4._____

5._____

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6._____

7._____

8._____

9._____

OBJECTIVE 21 **Evaluated on Job Sheet 5.**

OBJECTIVE 22 **Evaluated on Job Sheet 6.**

OBJECTIVE 23 **Evaluated on Job Sheet 7.**

OBJECTIVE 24 **Discuss using growth stimulants.** Write your answers in the space provided.

1. What functions are performed by growth hormones already present in the animal's body?

_____

_____

2. What would happen if an animal had too little growth hormone present in its body?

_____

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3. Compare the advantages and disadvantages of using growth hormones.

_____

_____

_____

_____

_____

_____

_____

_____

OBJECTIVE 25

Select from a list true statements about legal and ethical aspects of using growth hormones. Write an "X" in the blank before each true statement.

____ 1. A female child has almost twice the amount of estrogen production as a male child.

____ 2. According to the National Cattlemen's Association, there is no scientific evidence that natural or synthetic hormones fed to cattle are harmful to human health.

____ 3. Hormone levels from implanted steers are high compared to other foods.

____ 4. Hormone levels in foods from implanted steers are very low compared to the normal human levels.

____ 5. In a three-ounce serving, wheat germ and soybean oil have more nanograms of estrogen than beef from an implanted steer.

____ 6. About 50% of the hormone permitted in the daily consumption of meat is reduced during the digestive process.

____ 7. No more than 10% of a human's daily production of hormone is permitted to be present in the daily consumption of meat.

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____ 8. The FDA closely regulates the amount of growth hormone residue allowed in meat.

____ 9. Some consumer groups claim that hormone residues contaminate the meat and are harmful to humans.

____ 10. The estrogen level in eight ounces of beef from an implanted steer is almost as much as the normal estrogen level in an average man.

____ 11. The estrogen level of an implanted steer is less than one nanogram more than the estrogen level of an nonimplanted steer.

____ 12. The amount of hormone absorbed from meat by the human body is very small.

____ 13. The USDA closely regulates the amount of growth hormone residue allowed in meat.

____ 14. The penalties for failing to follow recommended withdrawal times are moderate.

____ 15. The USDA checks animal products closely for traces of residues from food additives or medications.

____ 16. Producers carefully follow recommended dosages and withdrawal times to protect their buyers and to protect themselves from penalties.

____ 17. The USDA maintains that residues in meats are harmful to humans.

____ 18. Three ounces of beef from an implanted steer has more nanograms of estrogen than three ounces of milk.

OBJECTIVE 26

Select from a list true statements about administering growth stimulants. Write an "X" in the blank before each true statement.

- **Methods of administering growth hormones**

____ 1. Hormones can be administered in feed.

____ 2. Growth hormones can be taken from one animal and transferred directly to another animal.

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____ 3. Hormones implanted in the ear using pellets are more effective than hormones that are injected.

____ 4. Hormones administered by injection are absorbed quickly.

____ 5. The hormones implanted in the ear using pellets are absorbed slowly.

____ 6. Hormones can be administered in drinking water.

____ 7. Genes that cause the production of extra growth hormones can be transferred from one animal to another.

- **Causes of improper implants**

____ 1. depositing the pellets between ridges of cartilage

____ 2. inserting the wrong amount of hormone

____ 3. crushing the pellet

____ 4. contaminating the pellet by touching it

____ 5. depositing the pellets between layers of skin

____ 6. gouging the cartilage of the ear

____ 7. using a contaminated needle

____ 8. placing the implant too close to the base of the ear

____ 9. failing to refrigerate the pellet

____ 10. placing the implant too close to the center of the ear

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OBJECTIVE 27

Choose the word or phrase to complete statements about growth stimulants. Write the letter of the correct answer in the blank.

____ 1. On cattle and sheep, antibiotics used as growth hormones are administered

A. by injection
B. by implants
C. orally
D. by injection or implants

____ 2. All of the following hormones are administered by implants **EXCEPT**

A. BST
B. PST
C. TBA
D. estrogen compounds

____ 3. The registered trade name for zeranol is

A. Finaplix®
B. Synovex®
C. Ralgro®
D. Compudose®

____ 4. MGA is used to increase the rate of gain and feed efficiency in

A. finishing heifers
B. feedlot steers
C. dairy cattle
D. all cattle

____ 5. The hormone used to increase the daily rate of gain and feed efficiency in feedlot lambs is

A. Ralgro®
B. MGA
C. TBA
D. Revelor®

____ 6. CALF-oid® is a registered trade name for

A. a somatotropin
B. an antibiotic
C. an estrogen compound
D. trenbolone acetate

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____ 7. BST is used to increase production in

A. dairy cattle
B. feedlot cattle
C. finishing heifers
D. all cattle

____ 8. PST has all of the following effects **EXCEPT**

A. finishing hogs have 15-20% faster gain
B. finishing hogs have increased fat depositation
C. lactating sows produce more milk
D. lactating sows wean heavier pigs

____ 9. The withdrawal time for MGA is

A. 12 hours
B. 24 hours
C. 48 hours
D. 72 hours

____ 10. The withdrawal period for porcine somatotropin (PST) is

A. 14 days
B. 21 days
C. 28 days
D. none

____ 11. The withdrawal period for estrogen compounds is

A. 24 hours
B. 48 hours
C. 3 days
D. none

____ 12. The product with a 40-day withdrawal period is

A. MGA
B. Ralgro® for cattle
C. Ralgro® for sheep
D. Compudose® 200

____ 13. TBA is used on

A. calves at least 45 days old
B. finishing heifers
C. finishing steers
D. finishing heifers and steers

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____ 14. A feature that antibiotics, Ralgro® for cattle, Compudose® 200 all have in common is that they

A. have no withdrawal period
B. are implanted
C. improve the rate of gain more than 10%
D. can be used on all cattle

____ 15. The weight break for using Synovex® S and Synovex® H instead of Synovex® C is

A. 400 lbs
B. 450 lbs
C. 500 lbs
D. 550 lbs

____ 16. If you wanted to get the maximum daily rate of gain and the maximum increase in feed efficiency in your cattle herd, you would use

A. zeranol
B. antibiotics
C. MGA
D. estrogen compounds

OBJECTIVE 28

State methods other than growth stimulants that improve the rate and efficiency of gain. State five methods in the space provided.

_____

_____

_____

_____

_____

_____

OBJECTIVE 29

Evaluated on Job Sheet 8.

OBJECTIVE 30

Evaluated on Assignment Sheet 3.

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What Makes This Cattle Herd So Efficient?

Simple records tell Butch Lovelady which decisions are right.

To hear Bob McGuire tell it, Ralph Lovelady manages the best commercial beef herd in Alabama. McGuire is an Alabama Extension beef specialist. And Ralph raises cattle in Bibb and Chilton counties.

Since 1950, Ralph and his family have made their living from cattle. And aside from sales of a small amount of hay, cattle are the sole source of income for the farm.

He and his son Butch focus strictly on economic traits to achieve calving and weaning rates in excess of 95%.

The color of the animals is of little importance. "Our best cattle are not the best looking," says Butch. "You'll see all colors in our herd -- spotted, black, red, and grey cows."

Ralph adds, "I wish we could keep cattle by the way they look, but we base this on performance."

"In producing calves, we are middle of the road," says Butch. "We don't go for short, stocky cattle, and we don't produce long, tall animals with a lot of daylight under them. Instead, we strive for uniformity and cattle with a medium frame."

To raise these calves, the Loveladys select cows and bulls for specific traits, such as good milking and mothering abilities. Their cow herd is young, with an average age of just over five years. Most of the cattle are Angus-based crossbreds; a few are Hereford-based corssbreds.

Bulls are selected for good disposition and for maternal characteristics that are passed on to females. Most are Simmental purebred or Simmental-Angus crosses.

Recordkeeping is important in this operation. The Loveladys began using Beef Cattle Improvement Association records early on.

"If a cow is in the bottom 10% she's costing you," says Butch. "We look for consistency, for cows that produce calves each year and remain in the top of the herd.

"For years, we've kept up with which cows calve on which dates," he adds.

The records are used to calculate adjusted 205-day weaning weights, which have averaged 603 pounds per head over the past four years. This,

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along with information on the cows, number of calves born, and average weights, allows the Loveladys to rank their cows according to production of fast-gaining calves.

Information on the 205-day calf weights is also used to project the weights of the calves at sale time.

Bulls and cows are matched to produce calves with frame scores designed to please packers. "Feedlots and packers want frame scores of high 5 or love 6," says Ralph.

Their forage program produces 10 months of grazing and allows 2 months for hay feeding. They produce all the bermudagrass and bahiagrass hay they feed, and they use shelled corn and mineral supplements for the cows and bulls.

A mixture of ryegrass and Yuchi clover provides grazing and boosts milk production in first-calf heifers.

By John Leidner

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RECOMMENDED VACCINATION TIMES

These recommendations are generalized. Specific programs must be tailored to your area and your individual needs. Refer to Unit C-1, "Animal Health Care" for information on creating a herd health care plan.

Cattle, sheep, and swine

- **blackleg and other clostridium infections (Sub Q or IM)**
  - calves – 4-6 months old
  - replacement heifers – 6-12 months old
  - feedlot cattle – within 48 hours of arrival
  - sheep – 2-4 weeks before shearing, castrating, and docking

    ☞ **NOTE:** In sheep, unlike cattle, infection through ingestion is rare; it usually follows an injury.

- **vibriosis (IM)**
  - replacement heifers – 6-12 months old
  - cow herd – 3-6 weeks before breeding
  - sheep – 2-4 weeks before breeding

- **leptospirosis (IM)**
  - calves – 4-6 months old
  - replacement heifers – 6-12 months old
  - cow herd – 3-6 weeks before breeding and mid-gestation
  - sows and gilts – 2-4 weeks before breeding or at weaning
  - ewes – 2-4 weeks before breeding
  - feedlot cattle – within 48 hours of arrival

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- **rednose (IM)**
  - replacement heifers – 6-12 months old
  - cow herd – 3-6 weeks before breeding
  - feedlot cattle – within 48 hours of arrival
- **enterotoxemia (Sub Q)**

  ☛ **NOTE:** Enterotoxemia is called *sudden death* in cattle and *overeating* or *pulpy kidney disease* in sheep.
  - cow herd – 3-6 weeks before calving
  - ewes – 2-4 weeks before lambing
  - lambs – 2 weeks before putting them in the feed lot

    ☛ **NOTE:** Give a second injection at an interval of not less than four weeks. A booster dose may be required six months after the second injection.
- **erysipelas (Sub Q or IM)**
  - sows – 4-6 weeks before farrowing
  - pigs – 4-6 weeks of age or at weaning
- **anemia (IM)** – pigs – 2-4 days old
- **staph mastitis (IM)**

  ☛ **NOTE:** Staph mastitis vaccine is generally given only in a dairy health program.
  - cows – 3-6 weeks before calving; 4-5 months after calving

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POULTRY

Vaccine	Schedule	Method of Administration
Marek's disease	1 day old	injection
infectious bronchitis	7-10 days (given with Newcastle vaccine, 10-14 days)	drinking water or dust
Newcastle disease	17-21 days (given with infectious bronchitis vaccine, 10-14 days); 4 months; booster every 3 months in egg production	drinking water, dust, or spray
fowl pox	8-14 weeks	wing-web
epidemic tremor	10-16 weeks	drinking water

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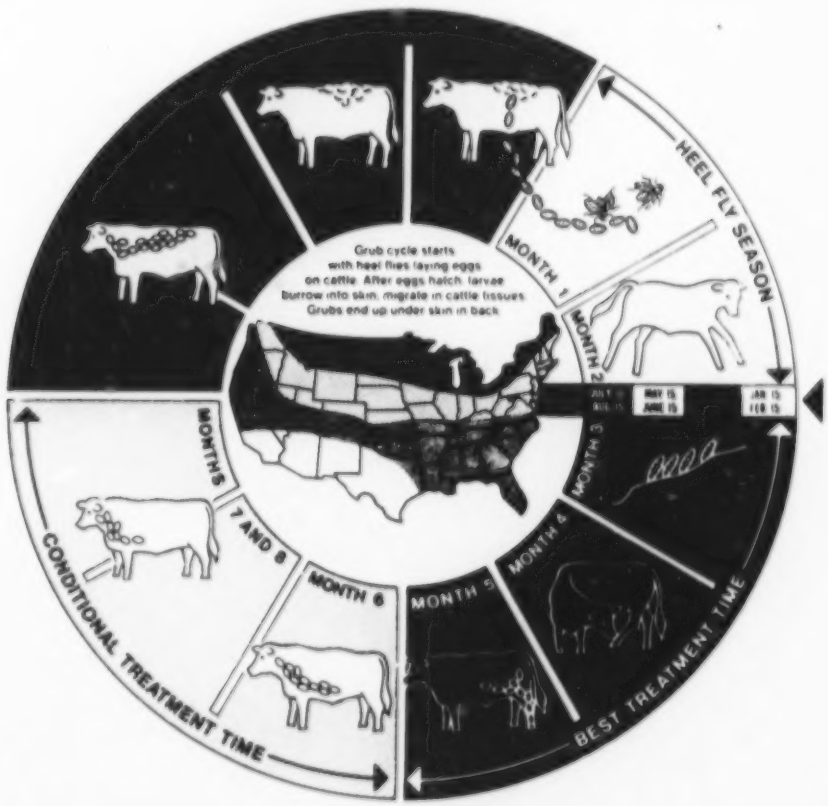
GRUB CYCLE CALENDAR

This chart can help you determine the best time to use WARBEX® to treat cattle for grubs. On the map, locate where your cattle originated. Dates on the area with the corresponding shading give the approximate heel fly activity periods for each area. Find these months in the heel fly activity column below. By reading across, you can find the months for most effective treatment.


Grub cycle starts with heel flies laying eggs on cattle. After eggs hatch, larvae burrow into skin, migrate in cattle tissues. Grubs end up under skin in back.
HEEL FLY SEASON
MONTH 1
MONTH 2
MONTH 3
MONTH 4
MONTH 5
MONTH 6
7 AND 8
MONTHS
BEST TREATMENT TIME
CONDITIONAL TREATMENT TIME

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LAP SHEET	DEHORNING, DOCKING, AND CASTRATION	C-5

Check the blank as you complete each step.

1.	**Take**	___ the pretest provided by your instructor. Have your instructor evaluate your completed test. After your test has been evaluated, follow your instructor's recommendations.
2.	**Read**	___ the introduction, unit objective, and specific objectives.
3.	**Do**	___ the focus assignments.
4.	**Stop**	___ and have your instructor evaluate your work from the focus assignment. After your work has been evaluated, follow your instructor's recommendations.
5.	**Study**	___ the Information Sheet, objective 1.
	Optional: Watch	___ a video on dehorning.
6.	**Study**	___ the Information Sheet, objective 2.
7.	**Ask**	___ your instructor to discuss with you the dangers of dehorning and the safety practices that can reduce or prevent injury.
8.	**Study**	___ the Information Sheet, objectives 3 and 4 together.
9.	**Ask**	___ your instructor to show you the tools used for dehorning and to demonstrate their use.
10.	**Study**	___ the Information Sheet, objective 5.
11.	**Ask**	___ your instructor to discuss with you how the age of the animal, size of horns, equipment and labor affect the choice of dehorning method.
12.	**Study**	___ the Information Sheet, objective 6.
13.	**Ask**	___ your instructor to use props to demonstrate how to stop bleeding.

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14. **Ask**	___	your instructor to demonstrate the guidelines and procedures in Job Sheet 1. Use the Job Sheet to follow along. Pay careful attention to any guidelines, cautions, and warnings.
15. **Review**	___	methods of restraining cattle in Unit C-1, "Animal Health Care."
16. **Practice**	___	the procedures demonstrated by your instructor. Use the Job Sheet as a guide.
17. **Stop**	___	and have your instructor evaluate your work from the Job Sheet. After your work has been evaluated, follow your instructor's recommendations.
18. **Ask**	___	your instructor to demonstrate the guidelines and procedures in Job Sheet 2. Use the Job Sheet to follow along. Pay careful attention to any guidelines, cautions, and warnings.
19. **Practice**	___	the procedures demonstrated by your instructor. Use the Job Sheet as a guide.
20. **Stop**	___	and have your instructor evaluate your work from the Job Sheet. After your work has been evaluated, follow your instructor's recommendations.
21. **Study**	___	the Information Sheet, objective 9.
Optional: **Ask**	___	your instructor to show a video on docking.
22. **Study**	___	the Information Sheet, objective 10.
23. **Ask**	___	your instructor to discuss with you the precautions and the consequences of failing to follow them.
24. **Study**	___	the Information Sheet, objectives 11 and 12 together.
25. **Ask**	___	your instructor to show you tools used for docking and demonstrate their use.
26. **Ask**	___	your instructor to discuss with you the advantages and disadvantages of each method and to demonstrate it.
Optional: **Talk**	___	with a livestock manager or veterinarian about docking.

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27.	**Ask**	___ your instructor to demonstrate the guidelines and procedures in Job Sheet 3. Use the Job Sheet to follow along. Pay careful attention to any guidelines, cautions, and warnings.
28.	**Review**	___ methods of restraining a lamb in Unit C-1, "Animal Health Care."
29.	**Review**	___ injection sites and injection methods from Unit C-4, "Vaccination and Drugs."
30.	**Practice**	___ the procedures demonstrated by your instructor. Use the Job Sheet as a guide.
31.	**Stop**	___ and have your instructor evaluate your work from the Job Sheet. After your work has been evaluated, follow your instructor's recommendations.
32.	**Ask**	___ your instructor to demonstrate the guidelines and procedures in Job Sheet 4. Use the Job Sheet to follow along. Pay careful attention to any guidelines, cautions, and warnings.
33.	**Practice**	___ the procedures demonstrated by your instructor. Use the Job Sheet as a guide.
34.	**Stop**	___ and have your instructor evaluate your work from the Job Sheet. After your work has been evaluated, follow your instructor's recommendations.
35.	**Study**	___ the Information Sheet, objective 15.
36.	**Ask**	___ your instructor to discuss the differences in castrating younger and older animals.
	Optional: Watch	___ a video on castration.
37.	**Study**	___ the Information Sheet, objective 16.
38.	**Ask**	___ your instructor to discuss with you the consequences that can occur if these precautions and safety factors are not followed.
	Optional: Ask	___ your instructor to demonstrate and compare the pressure and control required to use a sharp knife and dull knife.

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39.	**Study**	___ the Information Sheet, objectives 17 and 18 together.
40.	**Ask**	___ your instructor to show you tools used for castration and demonstrate their use.
41.	**Ask**	___ your instructor to discuss with you the advantages of each method.
	Optional: Ask	___ your instructor to share with you personal experiences castrating cattle, sheep, and swine.
42.	**Study**	___ the Information Sheet, objective 19.
	Optional: Talk	___ with a livestock manager or veterinarian about castration.
43.	**Ask**	___ your instructor to demonstrate the guidelines and procedures in Job Sheet 5. Use the Job Sheet to follow along. Pay careful attention to any guidelines, cautions, and warnings.
44.	**Review**	___ methods of restraining a lamb in Unit C-1, "Animal Health Care."
45.	**Review**	___ injection sites and injection methods from Unit C-4, "Vaccination and Drugs."
46.	**Practice**	___ the procedures demonstrated by your instructor. Use the Job Sheet as a guide.
47.	**Stop**	___ and have your instructor evaluate your work from the Job Sheet. After your work has been evaluated, follow your instructor's recommendations.
48.	**Ask**	___ your instructor to demonstrate the guidelines and procedures in Job Sheet 6. Use the Job Sheet to follow along. Pay careful attention to any guidelines, cautions, and warnings.
49.	**Practice**	___ the procedures demonstrated by your instructor. Use the Job Sheet as a guide.
50.	**Stop**	___ and have your instructor evaluate your work from the Job Sheet. After your work has been evaluated, follow your instructor's recommendations.

May be photocopied for student use.

51.	**Ask**	___ your instructor to demonstrate the guidelines and procedures in Job Sheet 7. Use the Job Sheet to follow along. Pay careful attention to any guidelines, cautions, and warnings.
52.	**Practice**	___ the procedures demonstrated by your instructor. Use the Job Sheet as a guide.
53.	**Stop**	___ and have your instructor evaluate your work from the Job Sheet. After your work has been evaluated, follow your instructor's recommendations.
54.	**Study**	___ the Information Sheet, objective 23.
55.	**Ask**	___ your instructor to demonstrate the techniques of debeaking, wing treatments, and caponizing.
56.	**Take**	___ the posttest provided by your instructor. Have your instructor evaluate your completed test. After your test has been evaluated, follow your instructor's recommendations.

May be photocopied for student use.

WRITTEN TEST

DEHORNING, DOCKING, AND CASTRATION

C-5

Name _____ Score _____

OBJECTIVE 1

Choose the word or phrase to complete statements about dehorning. Write the letter of the correct answer in the blank.

____ 1. All of the following statements about dehorning are true EXCEPT

A. Proper timing and using the proper method for the age of the animal are critical considerations.
B. For cattle two years and older, the horns are usually tipped.
C. A yearling calf will require about six weeks to regain its original weight following dehorning.
D. On older animals, the horns are filled with blood, so controlling the bleeding is a problem.

____ 2. Chemical dehorning is used on

A. calves three days to two weeks old
B. calves 60 days old
C. calves under a year old
D. calves and cattle of any age

____ 3. Dehorning reduces the possibility of property damage, injury to other stock and to humans, and

A. reduces illness during trucking and transfer
B. results in more rapid weight gain in feeder cattle
C. produces smoother, healthier hides
D. enhances the appearance of purebred cattle

____ 4. All of the following statements about chemical dehorning are true EXCEPT

A. apply a heavy layer of petroleum jelly to protect the skin and eyes
B. a scab will form after six or eight hours and will drop off in about one to two weeks
C. rub the chemical over the button according to the manufacturer's instructions
D. keep the calf out of the rain and away from the dam for 48 hours

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____ 5. Common caustics are liquid, paste, and sticks made of potash or

A. sodium hydroxide
B. sodium hypochlorite
C. phosphorous hydroxide
D. potassium hypochlorite

____ 6. Mechanical methods are used to physically remove horns from

A. cattle one year or older
B. cattle two years or older
C. calves three to ten days old
D. calves over two weeks old

____ 7. One of the advantages of dehorning a calf at 3 days is

A. reduced weight loss
B. bleeding can be controlled by elastration
C. reduced scarring on younger animals
D. any mechanical method can be used effectively

____ 8. Chemical dehorning should be limited to

A. fall calving
B. small herds
C. beef cattle
D. feeder cattle

OBJECTIVE 2

State precautions for dehorning. State four precautions.

_____

_____

_____

_____

_____

_____

May be photocopied for student use.

OBJECTIVE 3

Identify types of dehorners. Your instructor will show you the dehorning equipment. Write the name of each one in the appropriate blank.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____

_____

_____

OBJECTIVE 4

Match mechanical dehorning tools to their descriptions. Write the letter of the correct answer in the blank. Answers may be used more than once. Test items may have more than one answer.

A. Barnes dehorner
B. hot iron
C. elastrator
D. saw
E. dehorning spoon
F. dehorning tube
G. Keystone dehorner
H. clippers

____ 1. Bleeding can be a problem.

____ 2. Method or methods you can use that are bloodless.

____ 3. The cutting edge is placed evenly over the horn and about 1/4" of skin, then pushed down and twisted until the button comes off.

____ 4. The blood supply is cut off and the horn drops off in three to six weeks.

____ 5. These are tools used on calves under 60 days old.

____ 6. It sears and cauterizes the tissue at the horn base, killing the growth cells.

May be photocopied for student use.

____ 7. Knife blades cut and lift the horns out by the roots and crush the blood vessels.

____ 8. Use this tool to dig out the horn.

____ 9. Tools you would use to remove the horn with about 1/4" to 1/2" of the skin to make certain that horn-forming cells are destroyed.

____ 10. A strong rubber ring or band is slipped over the base of the horn, well down into the hairline.

____ 11. The cone-shaped, hollow tip is applied over the budding horn button for 10-20 seconds.

____ 12. Tool used to remove the hard, brittle horns of mature cattle.

____ 13. Use this tool on calves under five months old with horns less than 3/4" long.

____ 14. The tool or tools you would use on calves of weaning age (six to eight months).

OBJECTIVE 5

List factors that determine the appropriate method of dehorning. List the factors below.

_____

_____

_____

_____

OBJECTIVE 6

Select from a list ways to stop bleeding after dehorning. Write an "X" in the blank before ways to stop bleeding.

____ 1. Use a chemical clotting agent.

____ 2. Pinch off blood vessels with a Barnes dehorner.

____ 3. Sear the wound with a hot iron.

____ 4. Pack the horn cavity with cotton and tie with a tight bandage.

May be photocopied for student use.

____ 5. Administer antibiotics.

____ 6. Tie a heavy string around the poll below the dehorned area.

____ 7. Pick up the main artery under the cut with forceps and pull it until it breaks.

____ 8. Use a chemical blood stopper.

____ 9. Pull small arteries surrounding the cut until they break.

____ 10. Administer anticoagulants.

OBJECTIVE 7 **Evaluated on Job Sheet 1.**

OBJECTIVE 8 **Evaluated on Job Sheet 2.**

OBJECTIVE 9 **Choose the word or phrase to complete statements about docking.** Write the letter of the correct answer in the blank.

____ 1. Docking is desirable for all of the following reasons EXCEPT

A. docked lambs are cleaner in the rear end and are less likely to get parasites and diseases
B. long tails interfere with breeding ewes
C. docked lambs have a faster weight gain
D. docked lambs bring higher market prices

____ 2. To prevent bleeding after docking, you should

A. pull the skin toward the body
B. apply petroleum jelly
C. pack the wound with cotton, use a tight bandage
D. pinch the skin together to close the arteries

____ 3. The tail is cut off

A. at the first joint
B. at the first or second joint
C. 1.5-2" from the body
D. to leave a stub about .5" to 1" long

May be photocopied for student use.

____ 4. The appearance of docked lambs is

A. uniform and muscular
B. larger and firmer
C. rounded and soft
D. rounded and firm

____ 5. Lambs should be docked when they are between

A. one and three days old
B. two and seven days old
C. three and ten days old
D. five and ten days old

OBJECTIVE 10

State precautions for docking. Write the precautions for each category in the blanks.

1. Prevent infection.

_____

_____

2. Prevent parasites.

_____

_____

3. Control blood loss.

_____

_____

_____

4. Use good sanitation practices.

_____

_____

_____

_____

_____

May be photocopied for student use.

5. Prevent prolapse of the rectum.

_____

OBJECTIVE 11

Identify tools used in docking. Your instructor will show you the tools used in docking. Write the name of each one in the appropriate blank.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

_____

_____

OBJECTIVE 12

Match docking tools to their descriptions. Write the letter of the correct answer in the blank. Answers may be used more than once. Test items may have more than one answer.

A. Burdizzo
B. hot chisel and hot pincher
C. elastrator
D. emasculator
E. knife
F. hot iron

____ 1. This type of pincher is used with a knife to cut off the tail inside the closed jaws.

____ 2. Blades sear the wound, which results in less blood loss and less danger of infection than with a knife; but the wound heals slower.

____ 3. Restrain the lamb between your legs, hold the tail up, and cut where the two folds of skin join onto the tail.

____ 4. Tool to be used if you have scouring or unsanitary conditions.

____ 5. Tool or tools that you would use for bloodless docking.

May be photocopied for student use.

____ 6. This tool is used to dock older lambs because they are more likely to bleed heavily.

____ 7. Overheating can cause profuse bleeding.

____ 8. The tool cuts off the blood supply. The tail atrophies and falls off.

____ 9. Squeezing the handles cuts the tail and crushes part of the tissue to reduce bleeding.

____ 10. Protect the buttocks using a board with a hole or slot that the tail can stick through.

____ 11. The tool stretches a strong rubber ring that is placed at the point where the tail will be severed.

OBJECTIVE 13

Evaluated on Job Sheet 3.

OBJECTIVE 14

Evaluated on Job Sheet 4.

OBJECTIVE 15

Choose the word or phrase to complete statements about castration.

____ 1. Castration should be performed on animals as young as possible to reduce the amount of work, the possibility of excessive bleeding, and

A. increase their marketability
B. reduce danger to the handler
C. prevent scours
D. prevent nervousness

____ 2. A bull can develop a staggy appearance if he is castrated after the age of

A. four months
B. six months
C. eight months
D. twelve months

May be photocopied for student use.

____ 3. The advantages of castration include all of the following EXCEPT

A. brings higher prices at market
B. makes livestock easier to handle
C. increases resistance to disease
D. produces higher quality meat

____ 4. In swine, castration eliminates

A. boar odor in the meat
B. coarse hair and hide
C. weight loss
D. listlessness

____ 5. Castrating older bulls can create bleeding problems and

A. weight loss
B. dangerous temperament
C. nervousness
D. tetanus

____ 6. The methods of castration include all of the following EXCEPT:

A. external devices that don't remove tissues
B. cutting out all or part of the testicles
C. removing the prostate gland
D. injectable chemicals

OBJECTIVE 16

State precautions and safety factors for castration. Write your answers in the blanks. The number in parentheses is the number of precautions or factors for that section.

1. Prevent infection. (3)

_____

_____

_____

_____

2. Prevent parasites. (2)

3. Control stress. (4)

4. Use restraints. (4)

5. Observe safety factors. (4)

May be photocopied for student use.

OBJECTIVE 17

Identify castration tools. Your instructor will show you the castration tools. Write the name of each one in the appropriate blank.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

_____

_____

OBJECTIVE 18

Choose the word or phrase to complete statements about castration methods. Write the letter of the correct answer in the blank.

_____ 1. The elastrator should be used

A. if bleeding occurs
B. in combination with the emasculator
C. on younger animals
D. on older animals

_____ 2. The Burdizzo is clamped on the cord for

A. 15-20 seconds
B. 60 seconds
C. 10-15 seconds
D. 5 seconds

_____ 3. With a Burdizzo

A. clamp both cords at once
B. there is no blood
C. the castration process takes 15-20 seconds
D. the scrotum atrophies within six months

May be photocopied for student use.

____ 4. Castration with a Burdizzo requires

A. clamping in two places 1/4" apart
B. clamping in two places 1/2" apart
C. making one or two incisions
D. pulling out the spermatic cord

____ 5. Animals have soreness and swelling when castrated using

A. an inguinal ring
B. an emasculator
C. an elastrator
D. a Burdizzo

____ 6. When you pull a boar's cord, you should apply

A. backward tension
B. forward tension
C. as little tension as possible
D. just the tension you can apply with one hand

____ 7. When castrating young pigs, you can

A. remove the scrotum and testicles
B. make one incision or two incisions
C. retrieve a retracted testicle
D. remove the inguinal ring

____ 8. When you slit the scrotum down the side on cattle or sheep, the incision should start a few inches

A. above the top of the testicle
B. to the right of the testicle
C. to the left of the testicle
D. below the bottom of the testicle

____ 9. Using the end-incision method, you would make the cut

A. through the lower third of the scrotum
B. through the bottom third of the testicles
C. a few inches from the bottom of the scrotum
D. a few inches below the bottom of the testicles

May be photocopied for student use.

____ 10. In both incision methods, you could either scrape the cord or

A. cut it
B. use the Burdizzo
C. use the emasculator
D. apply the elastrator

____ 11. You would make your incisions long enough for good drainage and deep enough to cut through the

A. testicles, scrotum, membrane, and cords
B. scrotum, membrane, and cords
C. scrotum and membranes
D. testicles and cord

____ 12. Place an elastrator

A. around the middle of the testicles
B. at the upper end of the testicles
C. at the lower end of the testicles
D. around the bottom third of the scrotum

OBJECTIVE 19

State proper times and methods of castration for cattle, swine, and sheep.

1. What is the proper time for castrating sheep using a Burdizzo or elastrator?

_____

2. State the guideline for determining the proper time to castrate swine.

_____

_____

3. What method can be used on calves weighing up to 150 pounds?

_____

May be photocopied for student use.

4. List three methods that could be used to castrate calves three weeks old.

_____

_____

_____

5. What is the surgical procedure for castrating very young lambs?

_____

OBJECTIVE 20 **Evaluated on Job Sheet 5.**

OBJECTIVE 21 **Evaluated on Job Sheet 6.**

OBJECTIVE 22 **Evaluated on Job Sheet 7.**

OBJECTIVE 23 **Discuss poultry debeaking, caponizing, wing treatments, and other production practices.** Write your answers in the blanks.

1. Why are chickens debeaked?

_____

2. At what ages are chickens debeaked?

_____

_____

3. What tools are used to debeak a small flock?

_____

4. Describe the debeaking process.

_____

_____

May be photocopied for student use.

5. How do you stop bleeding after debeaking?

_____

6. State two advantages of caponizing.

_____

_____

7. At what age should you caponize cockerels?

_____

8. Where is the incision made in caponizing?

_____

9. At what age should you clip a poult's wings?

_____

10. Describe how to notch the wing.

_____

_____

11. What is the proper age for notching the wing?

_____

12. State two advantages of dubbing.

_____

_____

_____

_____

13. What are the two methods of controlling bleeding when dubbing older birds?

_____

_____

_____

May be photocopied for student use.

14. What is the proper timing for desnooding a poult?

_____

15. Where do you make the cut when desnooding?

_____

May be photocopied for student use.

Castration

Uncastrated animals have greater feed efficiency and a faster rate of gain than castrated animals, and they have leaner carcasses that should bring a higher market value.

If this is the case, then why do we practice castration? To meet consumer preferences. Meat from an uncastrated animal has a strong, relatively unpleasant flavor. That means consumers don't want it and the price for such meat is lower than the price for the milder, more tender, more flavorful meat from castrated animals.

In addition to bringing a higher price, castrated males gain faster and more efficiently than females. They also have a calmer disposition. The natural aggressiveness of uncastrated males can pose serious safety problems for other animals and for the handlers.

As animal rights advocates become more vocal, we'll be hearing more criticism of castration, especially because no anesthetic is used. The more radical and outspoken advocates are claiming that castration is not only cruel, but it violates the animal's right to lead a full, natural life.

We may see changes in methods of castration in the future. Anesthetics may be used, and there may also be new developments in pain reduction and infection control. However, given the consumer's preference for the taste of meat from castrated animals, it is unlikely that the practice will ever completely disappear.

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LAP SHEET	*HOOF TRIMMING, SHEARING, AND ANIMAL IDENTIFICATION*	**C-6**

Check the blank as you complete each step.

1. **Take**	___	the pretest provided by your instructor. Have your instructor evaluate your completed test. After your test has been evaluated, follow your instructor's recommendations.
2. **Read**	___	the introduction, unit objective, and specific objectives.
3. **Do**	___	the focus assignments.
4. **Stop**	___	and have your instructor evaluate your work from the focus assignment. After your work has been evaluated, follow your instructor's recommendations.
5. **Study**	___	the Information Sheet, objective 1.
Optional: Watch	___	a video on hoof care.
6. **Study**	___	the Information Sheet, objective 2.
7. **Ask**	___	your instructor to discuss the dangers of hoof trimming and safety practices that can reduce or prevent injury.
8. **Study**	___	the Information Sheet, objectives 3 and 4.
9. **Ask**	___	your instructor to show you hoof trimming tools and to discuss the advantages and disadvantages of each tool.
Optional: Ask	___	your instructor to share personal experiences with these methods.
Optional: Invite	___	a stock manager or veterinarian to discuss hoof trimming and care.
10. **Study**	___	the Information Sheet objective 5.

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Optional: Visit	___	a production operation to look at structural factors.
11. Ask	___	your instructor to demonstrate the guidelines and procedures in Job Sheet 1. Use the Job Sheet to follow along. Pay careful attention to any guidelines, cautions, and warnings.
12. Practice	___	the procedures demonstrated by your instructor. Use the Job Sheet as a guide.
13. Stop	___	and have your instructor evaluate your work from the Job Sheet. After your work has been evaluated, follow your instructor's recommendations.
14. Study	___	the Information Sheet, objective 7.
Optional: Ask	___	your instructor to give you the Handout on grading.
Optional: Watch	___	videos covering shearing tools, methods, and wool baling
Optional: Ask	___	a stock manager to demonstrate shearing techniques and methods.
15. Study	___	the Information Sheet, objectives 8 and 9.
16. Ask	___	your instructor to discuss safety practices during shearing.
Optional: Ask	___	your instructor to demonstrate lubricating shearing equipment.
Optional: Ask	___	your instructor to display a variety of blade types and sizes and discuss the benefits and problems associated with each.
17. Ask	___	your instructor to demonstrate the guidelines and procedures in Job Sheet 2. Use the Job Sheet to follow along. Pay careful attention to any guidelines, cautions, and warnings.
18. Practice	___	the procedures demonstrated by your instructor. Use the Job Sheet as a guide.

May be photocopied for student use.

19. **Stop**	___	and have your instructor evaluate your work from the Job Sheet. After your work has been evaluated, follow your instructor's recommendations.
20. **Study**	___	the Information Sheet, objective 11.
21. **Ask**	___	your instructor to discuss the benefits and problems associated with each identification method.
22. **Study**	___	the Information Sheet, objective 12.
23. **Ask**	___	your instructor to show you the basic tools used in livestock identification.
24. **Study**	___	the Information Sheet, objective 13.
Optional: Review	___	restraint procedures.
25. **Study**	___	the Information Sheet, objective 14.
26. **Ask**	___	your instructor to show you Transparency Master 1.
27. **Study**	___	the Information Sheet, objective 15.
Optional: Ask	___	your instructor to share personal branding experiences with you.
Optional: Talk	___	with a stock manager or veterinarian about branding.
Optional: Watch	___	a video on handling, restraining, and branding.
Optional: Design	___	your own personal brand.
28. **Ask**	___	your instructor to demonstrate the guidelines and procedures in Job Sheet 3. Use the Job Sheet to follow along. Pay careful attention to any guidelines, cautions, and warnings.
29. **Practice**	___	the procedures demonstrated by your instructor. Use the Job Sheet as a guide.

May be photocopied for student use.

30.	**Stop**	___ and have your instructor evaluate your work from the Job Sheet. After your work has been evaluated, follow your instructor's recommendations.
31.	**Ask**	___ your instructor to demonstrate the guidelines and procedures in Job Sheet 4. Use the Job Sheet to follow along. Pay careful attention to any guidelines, cautions, and warnings.
32.	**Practice**	___ the procedures demonstrated by your instructor. Use the Job Sheet as a guide.
33.	**Stop**	___ and have your instructor evaluate your work from the Job Sheet. After your work has been evaluated, follow your instructor's recommendations.
34.	**Ask**	___ your instructor to demonstrate the guidelines and procedures in Job Sheet 5. Use the Job Sheet to follow along. Pay careful attention to any guidelines, cautions, and warnings.
35.	**Practice**	___ the procedures demonstrated by your instructor. Use the Job Sheet as a guide.
36.	**Stop**	___ and have your instructor evaluate your work from the Job Sheet. After your work has been evaluated, follow your instructor's recommendations.
37.	**Study**	___ the Information Sheet, objective 19.
38.	**Ask**	___ your instructor to show you Transparencies 2-4.
39.	**Ask**	___ your instructor to discuss why tracking litter number and litter position number are important.
	Optional: Watch	___ a video on ear notching.
40.	**Do**	___ Assignment Sheet 1.
41.	**Stop**	___ and have your instructor evaluate your work from the Assignment Sheet. After your work has been evaluated, follow your instructor's recommendations.
42.	**Study**	___ Job Sheet 6.

May be photocopied for student use.

43. **Ask** ___ your instructor to demonstrate the guidelines and procedures in Job Sheet 6. Use the Job Sheet to follow along. Pay careful attention to any guidelines, cautions, and warnings.

44. **Practice** ___ the procedures demonstrated by your instructor. Use the Job Sheet as a guide.

45. **Stop** ___ and have your instructor evaluate your work from the Job Sheet. After your work has been evaluated, follow your instructor's recommendations.

46. **Study** ___ the Information Sheet, objective 22.

Optional:
Ask ___ your instructor to show you the tools used for each tag type.

Optional:
Ask ___ your instructor to discuss benefits and problems associated with each type of tag.

47. **Ask** ___ your instructor to demonstrate the guidelines and procedures in Job Sheet 7. Use the Job Sheet to follow along. Pay careful attention to any guidelines, cautions, and warnings.

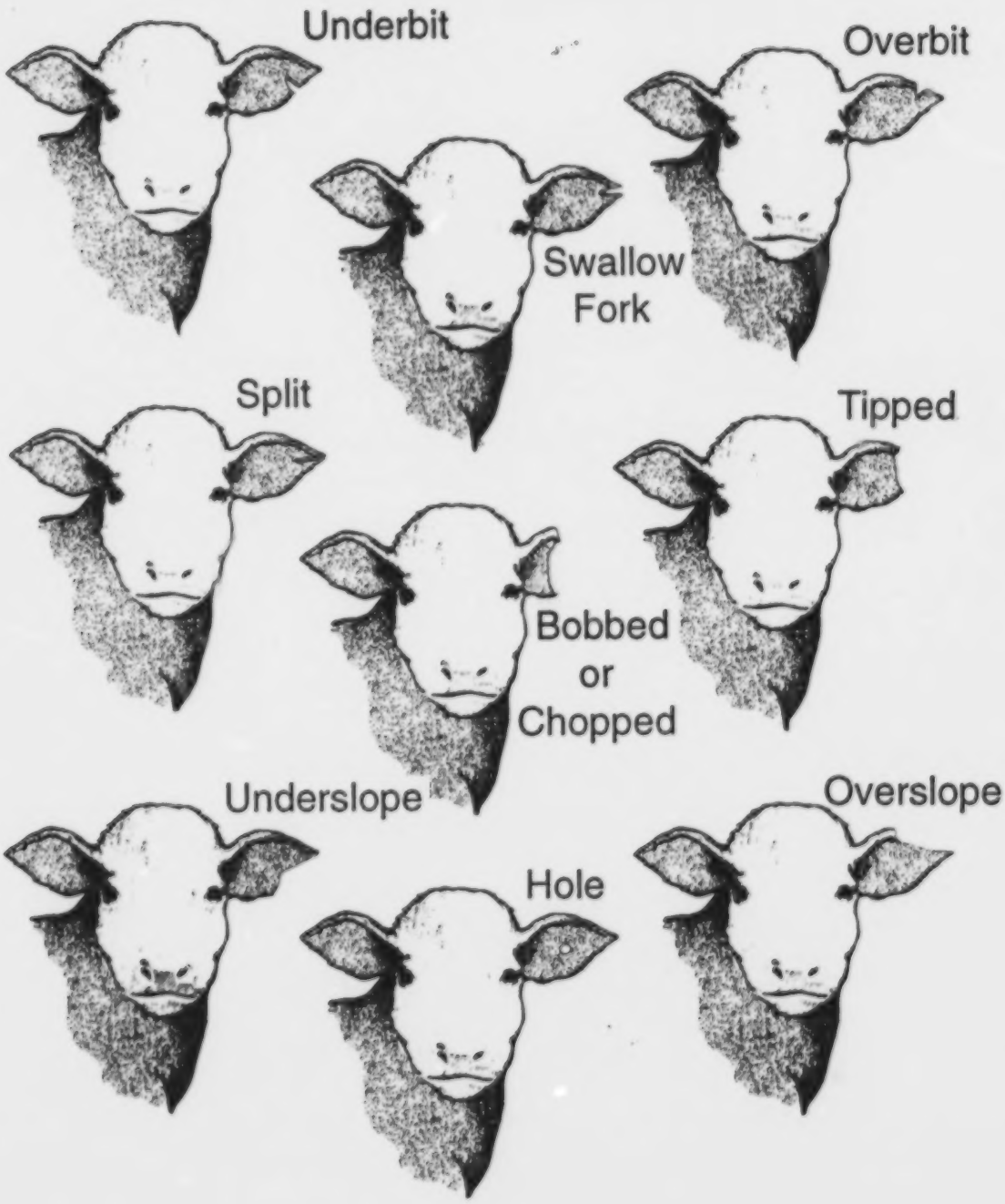
48. **Practice** ___ the procedures demonstrated by your instructor. Use the Job Sheet as a guide.

49. **Stop** ___ and have your instructor evaluate your work from the Job Sheet. After your work has been evaluated, follow your instructor's recommendations.

50. **Take** ___ the posttest provided by your instructor. Have your instructor evaluate your completed test. After your test has been evaluated, follow your instructor's recommendations.

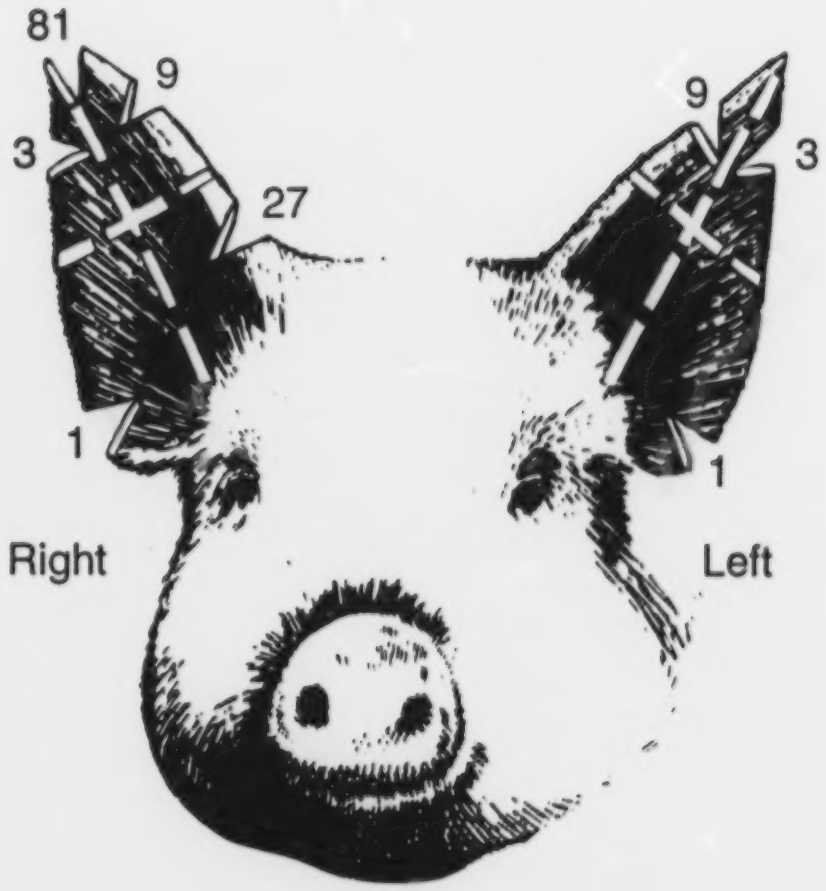
May be photocopied for student use.

Common Cattle Earmarks



May be photocopied for student use.

Standard Ear Notching System



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Ear Notching - Litter Numbers

Litter #11

Litter #79

Litter #31

Litter #161

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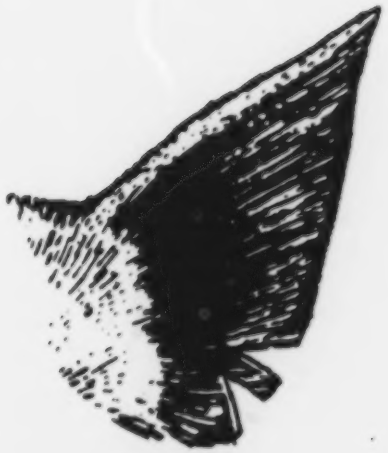
INSTRUCTOR'S RESOURCE PACKAGE - Animal Science
TRANSPARENCY MASTER 3 - CIMC - C-6 - 1

Ear Notching - Individual Pig Numbers



Pig #2

Pig #7

Pig #5

Pig #12

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WRITTEN TEST

HOOF TRIMMING, SHEARING, AND ANIMAL IDENTIFICATION

C-6

Name _____ Score _____

OBJECTIVE 1

Choose the word or phrase to complete statements about hoof trimming. Write the letter of the correct answer in the blank.

____ 1. As the hooves become overgrown, normal weight distribution is affected and the laminae will become irritated, causing

A. lameness
B. the weight to shift even further
C. cracking and infection
D. the pastern to swell

____ 2. Regular hoof care, including hoof trimming, is important to animal appearance and show quality because poor hoof care can lead to

A. a dull or off-color coat
B. severe weight loss
C. stunted growth
D. poor posture

____ 3. Irritated hooves can crack and

A. become open to infection and disease
B. swell, causing the weight to shift even further
C. lead to further laminae swelling
D. bleed

____ 4. Animals in need of hoof trimming may do all the following EXCEPT

A. consume less food
B. produce less sperm
C. refuse or be unable to mate
D. produce tainted milk

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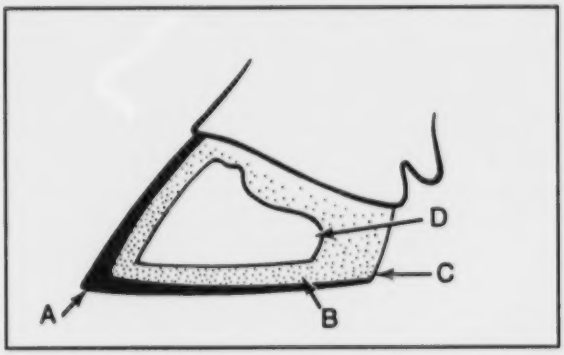
____ 5. In the figure below, the laminae is part

A. A
B. B
C. C
D. D



____ 6. The open space between the toes is the

A. interstitial bulb
B. interdigital space
C. axil groove
D. pedal groove

____ 7. Hoof sidewalls become overgrown because

A. the animal walks on the inside of the hoof
B. the animal walks on the outside of the hoof
C. soft ground surfaces don't wear down normal hoof growth
D. the laminae forces the sidewalls to grow outward

____ 8. Correct trimming means to

A. create an even load-bearing surface
B. cut away all the irritated hoof surface
C. file from the center outward
D. file from the edge toward the center

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OBJECTIVE 2

State precautions and safety considerations for hoof trimming. State five precautions.

1. _____

_____

2. _____

_____

3. _____

_____

4. _____

_____

5. _____

_____

OBJECTIVE 3

Identify hoof trimming tools. Your instructor will show you hoof trimming tools. Write the names of the tools in the correct blanks.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____

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OBJECTIVE 4

Match hoof trimming tools to their uses. Write the letter of the correct answer in the blank. Answers may be used more than once.

A. electric grinder
B. hoof knife
C. hoof gouges
D. electric trimmer
E. hoof rasp
F. hoof nippers
G. chisel
H. hoof trimmer

____ 1. trims the animal's toe with minimum restraint

____ 2. smoothes and shapes the hoof

____ 3. clip back the majority of the hoof growth

____ 4. chips off the animal's toes

____ 5. cleans dirt and manure from the hoof

OBJECTIVE 5

Select trimming procedures according to the animal's structural factors. Write the letter of the correct answer in the blank.

____ 1. Which of the following statements is true for trimming the hooves according to the animal's structural characteristics?

A. Hoof trimming will straighten a calf's legs.
B. Hoof trimming will minimize a defect.
C. Hoof trimming will correct some structural defects.
D. Hoof trimming will not affect a defect.

____ 2. Cow-hocked animals need the outside hoof trimmed as short as possible and the inside hoof trimmed

A. longer on the rear legs
B. shorter on the rear legs
C. longer on the front legs
D. longer on the front legs

____ 3. The side toward which the toe points should be trimmed

A. on the inside
B. on the outside
C. longer
D. shorter

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____ 4. For an animal with correct structural features, you would

A. trim and shape the hoof evenly and level the bottom of the hoof
B. trim the outside hoof as short as possible and level the bottom of the hoof
C. trim the outside hoof as short as possible on the front legs and trim the hoof longer on the rear legs
D. trim for appearance and balance

____ 5. If a steer has its toes in, you would

A. trim the toes as short as possible and leave the heel
B. trim the inside hoof as short as possible and then trim the outside hoof longer than the hoof on the inside on the front legs
C. trim the outside hoof as short as possible and then trim the inside hoof longer on the rear legs
D. trim the outside hoof as short as possible and then trim the inside hoof longer than the outside of the hoof on the front legs

____ 6. If an animal is post-legged and buck-kneed,

A. trim the toes as short as possible and leave the heel
B. trim the heels as short as possible and leave more toe
C. trim the outside hoof as short as possible and then trim the inside hoof longer on the rear legs
D. trim the outside hoof as short as possible and then trim the inside hoof longer than the outside of the hoof on the front legs

____ 7. For an animal with its toes out, you would trim the inside hoof as short as possible and then trim the outside hoof

A. longer than the hoof on the inside on the back legs
B. shorter than the hoof on the inside on the front legs
C. longer than the hoof on the inside on the front legs
D. shorter than the hoof on the inside on the front legs

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____ 8. For cattle wide at the hocks, trim the inside hoof as short as possible and then trim the

A. outside hoof longer on the rear legs
B. outside hoof longer on the front legs
C. toes as short as possible
D. heels as short as possible

____ 9. If an animal is sickle-hocked and back at the knees,

A. trim the heels as short as possible and leave more toe
B. trim the heels as long as possible and leave more toe
C. trim the toes as short as possible and leave the heel
D. trim the toes as long as possible and leave the heel

OBJECTIVE 6

Evaluated on Job Sheet 1.

OBJECTIVE 7

Choose the word or phrase to complete statements about shearing. Write the letter of the correct answer in the blank.

____ 1. Shearing is usually performed

A. in the summer
B. just before mating
C. on adult animals only
D. by professional shearers

____ 2. If you shear in April, you could shear again in

A. October to April
B. July to September
C. August to October
D. September to December

____ 3. Shearing increases wool profitability by

A. encouraging new wool growth and increasing the number of times the product can be taken to market
B. encouraging growth of the higher quality wool which grows nearest the hide
C. reducing the amount of hay, manure, and other matter in the wool
D. keeping old growth from getting matted

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____ 4. Two reasons for tagging are

A. increasing profits and monitoring pregnant animals
B. monitoring pregnant ewes and aiding nursing ewes
C. identifying nursing ewes and increasing profits
D. aiding pregnant ewes and weaning

____ 5. Before being bundled for sale, wool is

A. combed and separated
B. graded
C. removed as one piece
D. dried

____ 6. Winter shearing is desirable because the sheep

A. stay inside
B. take up less space
C. have leaner carcasses
D. increase their feed efficiency

____ 7. Wool-buying representatives of Mid-State Wool Growers are located in all the following cities EXCEPT:

A. Madill
B. Byron
C. Hydro
D. Mutual

____ 8. John is getting his sheep ready for shearing. He has 40 white ewes, 33 white weaned lambs, 16 white nursing lambs, 12 black ewes, and a black ram. Before shearing, he should separate them into the following groups:

A. rams, ewes, and lambs
B. rams and ewes (the lambs will not be sheared)
C. black animals and white animals
D. black animals, white animals, and lambs

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OBJECTIVE 8

State good shearing practices. Write eight practices in the blanks.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____

OBJECTIVE 9

State practices for maintaining shearing equipment.

1. _____
   _____
2. _____
   _____
3. _____
   _____
4. _____
   _____
5. _____
   _____

May be photocopied for student use.

OBJECTIVE 10

Evaluated on Job Sheet 2.

OBJECTIVE 11

Choose the word or phrase to complete statements about animal identification.

____ 1. Along with providing proof of ownership, permanently identifying animals accomplishes all the following EXCEPT:

A. documenting pedigree
B. identifying breed
C. identifying animal's age
D. tracking breeding results

____ 2. Jenny registered her "Rocking O" brand in 1993. The registration will have to be renewed in

A. 1994
B. 1995
C. 2000
D. 2003

____ 3. The recording of brands is provided for by cattle organizations in

A. western states
B. southern states
C. midwestern states
D. all states

____ 4. Brands are registered by the

A. county sheriff
B. Cattleman's Association
C. county extension service
D. Beef Producers Association

____ 5. Registering brands is

A. required by law
B. not recognized in a court
C. not required by law
D. done through the court system

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____ 6. The diameter of a brand must be no less than

A. three inches
B. four inches
C. five inches
D. six inches

____ 7. The brand locations on cattle are

A. shoulders and hips
B. shoulders, ribs, and hips
C. shoulders, ribs, hips and head
D. shoulders, ribs, hips, head, and ear

____ 8. Two separate brand registrations are necessary if

A. two breeds use the same brand
B. the animal is used for two products
C. two people share ownership of the animal
D. two brand locations are used

____ 9. All the following are registerable brands EXCEPT:

A.

B.

C.

D.

____ 10. If you buy branded livestock, you should be sure to

A. register the brand
B. rebrand them in a different brand location
C. secure a bill of sale
D. place your brand on top of the old brand

May be photocopied for student use.

OBJECTIVE 12

Identify basic tools used in livestock identification. Your instructor will show you tools used in livestock identification. Write the names of the tools in the correct blanks.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____

OBJECTIVE 13

Complete a chart on methods of identification for cattle, swine, and sheep. Write an "X" in the column if the method of identification is used for that animal

Method	Cattle	Sheep	Swine
hot iron branding			
freeze branding			
paint branding			
tattooing ear or lip			
tagging			
noseprinting			
ear notching			
neck chains or straps			
horn brands			
electronic transmitters			

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OBJECTIVE 14

Identify common earmarks for cattle. Write the name of the earmark in the blank under each illustration.

1. _____

2. _____

3. _____

4. _____

May be photocopied for student use.

5. _____

6. _____

7. _____

8. _____

May be photocopied for student use.

9. _____

OBJECTIVE 15

Select from a list tips for hot iron branding. Write an "X" in the blank before each tip for branding.

____ 1. The iron should be heated until it is the color of ashes.

____ 2. Acids and other branding fluids are not recommended.

____ 3. When the iron is the right temperature, hold it in place for five to ten seconds.

____ 4. Irons that are too hot blotch the brand and are hard to read.

____ 5. Blotching occurs when two parts of an iron come together.

____ 6. Simple brand patterns are best.

____ 7. The iron should be heated until it takes on a red-orange color.

____ 8. The brand should be the color of saddle leather.

____ 9. A deeper brand will be more permanent.

____ 10. Clip the brand area when animals have a heavy or soiled hair coat.

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____ 11. Use acids or cold branding for calves; hot branding for yearlings or mature cattle.

____ 12. The brand should be black.

____ 13. Rock the iron to assure a burn on all parts of the brand.

____ 14. Burn only the outer layer of skin and no deeper.

____ 15. Use the appropriate size iron (3-5 inches) for the size of the animal.

____ 16. Geometric patterns are best.

____ 17. The iron is too hot when the hair catches fire.

____ 18. As the brand begins to fade, a new brand should be placed over the old one.

____ 19. When the iron is the right temperature, hold it in place for three to five seconds.

____ 20. Rocking the iron will blotch the brand.

____ 21. Branding on any part of a previous brand is a violation of branding laws.

____ 22. Apply oil or grease to the branded area to encourage smoother, faster peeling.

OBJECTIVE 16 **Evaluated on Job Sheet 3.**

OBJECTIVE 17 **Evaluated on Job Sheet 4.**

OBJECTIVE 18 **Evaluated on Job Sheet 5.**

May be photocopied for student use.

OBJECTIVE 19 | **State rules for ear notching pigs.**

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

OBJECTIVE 20 | **Evaluated on Assignment Sheet 1.**

OBJECTIVE 21 | **Evaluated on Job Sheet 6.**

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OBJECTIVE 22 | **List guidelines for ear-tagging sheep.**

1. _____

2. _____

3. _____

4. _____

5. _____

OBJECTIVE 23 | **Evaluated on Job Sheet 7.**

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Wool Grades

There are two systems in use for grading, the count system and the micron system. In the count system, wool is divided into 14 grades according to the thickness or diameter of the average fibers in the fleece. The "count" refers to the number of hanks (bundles 560 yards long) that can be spun from one pound of clean wool. Wool with the high counts is finer and can be spun into longer, finer yarn. For example, a 64's yields 64 hands of yarn per pound of clean wool (64 x 560 = 35,840 yards of yarn); and a 44's count of clean wool yields 44 hanks per pound.

In the micron system, there are 16 grades, based on the thickness of an average fiber measured by a micrometer. A micron is 1/25,400 of an inch. For example, an 80's wool, averages about 18 microns. There is a growing effort to standardize all wool grades to the micron system.

Grading is usually performed by professional graders, but you could learn to separate your wool into general grades and with training, could become an accurate grader.

For more information on grading, call the Mid-State Wool Growers Association, in Hutchinson, Kansas, 800-835-9665.

Wool Grades

Type of Wool	Standard Specifications	
	Numerical Count Grade	Limits for Average Fiber Diameter (microns)
Fine	Finer than 80s	Under 17.70
Fine	80s	17.10-19.14
Fine	70s	19.15-20.59
Fine	64s	20.60-22.04
Medium	62s	22.05-23.49
Medium	60s	23.50-24.94
Medium	58s	24.95-26.39
Medium	56s	26.40-27.84
Medium	54s	27.84-29.29
Medium	50s	29.30-30.99
Coarse	48s	31.00-32.69
Coarse	46s	32.70-34.39
Coarse	44s	34.40-36.19
Very coarse	40s	36.20-38.09
Very coarse	36s	38.10-40.20
Very coarse	Coarser than 36s	Over 40.20

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LAP SHEET	MARKETING LIVESTOCK AND MARKET AGENCIES	D-1

Check the blank as you complete each step.

1. Take	___ the pretest provided by your instructor. Have your instructor evaluate your completed test. After your test has been evaluated, follow your instructor's recommendations.
2. Read	___ the introduction, unit objective, and specific objectives.
3. Do	___ the focus assignments.
4. Stop	___ and have your instructor evaluate your work from the focus assignment. After your work has been evaluated, follow your instructor's recommendations.
5. Study	___ the Information Sheet, objective 1.
Optional: Write	___ a short paper on the history and changes in livestock marketing.
Optional: Read	___ trade journals relating to livestock marketing.
6. Study	___ the Information Sheet, objective 2.
Optional: Write	___ advantages and disadvantages of each type of marketing.
Optional: Read	___ one or more of the following OSU publications: "Livestock Futures Markets," "Basis: The Key to Successful Livestock Hedging," "Electronic Marketing in Oklahoma: Experiences and Opportunities," "Basics of Live Cattle Options Trading," "Oklahoma City Minus Chicago Mercantile Exchange Stocker Steer Basis," "Assessing Group Marketing Alternatives for Livestock," and "Marketing Beef in Oklahoma: A Home Study Course."

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Optional: Write ___ a paper on the futures market.

7. Do ___ Assignment Sheet 1.

8. Stop ___ and have your instructor evaluate your work from the Assignment Sheet. After your work has been evaluated, follow your instructor's recommendations.

9. Do ___ Assignment Sheet 2.

10. Stop ___ and have your instructor evaluate your work from the Assignment Sheet. After your work has been evaluated, follow your instructor's recommendations.

11. Study ___ the Information Sheet, objectives 5-6.

Optional: Listen ___ to a guest speaker about livestock auctions.

Optional: Visit ___ a livestock auction.

12. Study ___ the Information Sheet, objectives 7-11.

Optional: Refer ___ to Meat and Poultry Processing, Unit IV "Purchasing Livestock for Slaughter," and Unit VI "Quality and Yield Grading Meat and Poultry Products" for further information.

Optional: Watch ___ the videos *Beef Quality Grading* and *Beef Yield Grading*.

Optional: Read ___ USDA publications on grading.

13. Do ___ Assignment Sheet 3.

14. Stop ___ and have your instructor evaluate your work from the Assignment Sheet. After your work has been evaluated, follow your instructor's recommendations.

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15. **Do**	___	Assignment Sheet 4.
16. **Stop**	___	and have your instructor evaluate your work from the Assignment Sheet. After your work has been evaluated, follow your instructor's recommendations.
17. **Do**	___	Assignment Sheet 5.
18. **Stop**	___	and have your instructor evaluate your work from the Assignment Sheet. After your work has been evaluated, follow your instructor's recommendations.
19. **Study**	___	the Information Sheet, objective 15.
Optional: List	___	the differences in marketing crossbred and purebred cattle.
Optional: Read	___	breed association magazines.
Optional: Listen	___	to a guest speaker about marketing purebred cattle.
20. **Do**	___	Assignment Sheet 6.
21. **Stop**	___	and have your instructor evaluate your work from the Assignment Sheet. After your work has been evaluated, follow your instructor's recommendations.
22. **Do**	___	Assignment Sheet 7.
23. **Stop**	___	and have your instructor evaluate your work from the Assignment Sheet. After your work has been evaluated, follow your instructor's recommendations.
24. **Take**	___	the posttest provided by your instructor. Have your instructor evaluate your completed test. After your test has been evaluated, follow your instructor's recommendations.

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WRITTEN TEST

MARKETING LIVESTOCK AND MARKET AGENCIES

D-1

Name _____ Score _____

OBJECTIVE 1

Choose the word or phrase to complete statements about marketing livestock. Write the letter of the correct answer in the blank.

____ 1. The marketing system allows livestock and livestock products to be moved from the producer to the

A. wholesaler
B. consumer
C. end producer
D. retailer

____ 2. The Wholesome Meat Act assures consumers of wholesome meat and meat products, truthful labeling of meat and meat products, and

A. stable prices
B. low prices
C. sanitary processing conditions
D. availability of meat and meat products

____ 3. Humanitarian regulations include the 28-Hour Law and the

A. Humane Slaughter Act
B. Cruelty Prevention Act
C. Processing Law
D. Animal Ethics Code

____ 4. Grading is both optional and

A. free of charge
B. charged to both the producer and the packer
C. charged to the producer
D. charged to the packer

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____ 5. Livestock marketing includes two marketing systems: the cash market and the

A. credit market
B. futures market
C. prepayment market
D. loan market

____ 6. Livestock are marketed according to class and

A. time of day
B. type
C. color
D. grade

OBJECTIVE 2

Discuss types of marketing. Write your answers in the blanks.

1. What is auction marketing?

_____

_____

2. Describe two ways of direct marketing.

_____

_____

_____

_____

3. What are electronic markets?

_____

_____

_____

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4. Describe two types of electronic markets.

5. What are terminal markets?

6. How can the futures market help producers?

7. What does marketing by carcass grade and weight allow?

OBJECTIVE 3 **Evaluated on Assignment Sheet 1.**

OBJECTIVE 4 **Evaluated on Assignment Sheet 2.**

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OBJECTIVE 5

State characteristics of the Packers and Stockyards Act. Write four characteristics in the blanks.

1. _____

_____

2. _____

_____

3. _____

_____

4. _____

_____

OBJECTIVE 6

Select from a list types of charges and selling fees involved in livestock auctions. Place an "X" in front of correct answers.

CHARGES

____ 1. Meals

____ 2. Services

____ 3. Hotel

____ 4. Commission for selling

____ 5. Yardage

____ 6. Parking

____ 7. Feed

SELLING FEES

____ 8. Per pound basis

____ 9. Per head basis

____ 10. Percentage of gross sales

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OBJECTIVE 7

State factors that determine dressing percentage of cattle. Write your answers in the blanks.

1. _____

2. _____

3. _____

OBJECTIVE 8

Select from a list factors which affect quality grade. Place an "X" in front of correct answers.

____ 1. Wholesomeness

____ 2. Color

____ 3. Size of cut

____ 4. Amount of fat

____ 5. Packaging

____ 6. Gender

____ 7. Carcass age

____ 8. Breed

OBJECTIVE 9

State factors on which yield grades are based. Write your answers in the blanks.

1. _____

2. _____

3. _____

4. _____

May be photocopied for student use.

OBJECTIVE 10

Discuss shrinkage. Write your answers in the blanks.

1. Why is shrink of concern to producers and packers?

_____

_____

2. Name five factors that affect shrink.

_____

_____

_____

_____

_____

3. What is a major means of minimizing shrink?

_____

4. What is tissue shrinkage?

_____

OBJECTIVE 11

Select from a list major causes of livestock bruises. Place an "X" in front of correct answers.

____ 1. Rough and careless handling

____ 2. Horned cattle

____ 3. Transporting long distances

____ 4. Projections from objects

____ 5. Transporting livestock that is too young

____ 6. Overloading or underloading

____ 7. Transporting in extreme weather conditions

____ 8. Failure to properly partition livestock by different kinds and class when in transit

May be photocopied for student use.

OBJECTIVE 12 **Evaluated on Assignment Sheet 3.**

OBJECTIVE 13 **Evaluated on Assignment Sheet 4.**

OBJECTIVE 14 **Evaluated on Assignment Sheet 5.**

OBJECTIVE 15 **Discuss marketing of purebred cattle.** Write your answers in the blanks.

1. How are purebred cattle usually sold?

_____

_____

2. How might purebred breeder advertise?

_____

_____

OBJECTIVE 16 **Evaluated on Assignment Sheet 6.**

OBJECTIVE 17 **Evaluated on Assignment Sheet 7.**

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LAP SHEET	MARKET GRADES AND CLASSES OF LIVESTOCK	D-2

Check the blank as you complete each step.

1. Take	___ the pretest provided by your instructor. Have your instructor evaluate your completed test. After your test has been evaluated, follow your instructor's recommendations.
2. Read	___ the introduction, unit objective, and specific objectives.
3. Do	___ the focus assignments.
4. Stop	___ and have your instructor evaluate your work from the focus assignment. After your work has been evaluated, follow your instructor's recommendations.
5. Study	___ the Information Sheet, objective 1.
Optional: Watch	___ a video that introduces market grades and classes of livestock.
Optional: Visit	___ a stockyard and have your instructor identify different market grades and classes of livestock.
6. Study	___ the Information Sheet, objective 2.
Optional: Talk	___ to a stock manager about factors he or she uses when selecting feeder cattle.
7. Study	___ the Information Sheet, objective 3.
Optional: Identify	___ age categories in a herd.
8. Study	___ the Information Sheet, objective 4.
Optional: Ask	___ your instructor to use a live animal to point out the indicators of yield grades.

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9. **Study**	___	the Information Sheet, objective 5.
10. **Ask**	___	your instructor to review the yield grade calculation.
Optional: Watch	___	a video on yield grading.
Optional: Talk	___	with a USDA extension agent about how to determine yield grade.
Optional: Visit	___	a meat packing facility to determine yields and retail cuts on beef carcasses.
11. **Ask**	___	your instructor for Handout 1.
12. **Do**	___	Assignment Sheet 1.
13. **Stop**	___	and have your instructor evaluate your work from the Assignment Sheet. After your work has been evaluated, follow your instructor's recommendations.
14. **Study**	___	the Information Sheet, objective 7.
Optional: Watch	___	a video on quality grading of cattle.
Optional: Visit	___	a meat packing facility to examine the degrees of marbling in selected carcasses.
Optional: Look at	___	color photos of marbling.
15. **Study**	___	the Information Sheet, objective 8.
Optional: Watch	___	a video on slaughter grades of cattle.
16. **Study**	___	the Information Sheet, objective 9.
Optional: Watch	___	a video on the qualifications for feeder grades of cattle.

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Optional: Ask ___ your instructor to use a live animal to demonstrate frame size and thickness specifications.

17. Do ___ Assignment Sheet 2.

18. Stop ___ and have your instructor evaluate your work from the Assignment Sheet. After your work has been evaluated, follow your instructor's recommendations.

19. Study ___ the Information Sheet, objective 11.

Optional: Watch ___ a video on determining market classes of sheep.

Optional: Visit ___ a sheep ranch and observe factors that determine market classes of sheep.

20. Study ___ the Information Sheet, objective 12.

Optional: Visit ___ a stockyard auction and compare selling prices of different age groups of sheep.

Optional: Listen ___ to stock reports or collect them from newspapers and chart the selling prices of sheep by age group.

21. Study ___ the Information Sheet, objective 13.

Optional: Visit ___ a meat packing facility to examine quality-indicating characteristics and cutability.

22. Study ___ the Information Sheet, objective 14.

Optional: Watch ___ a video on grading slaughter lambs.

Optional: Ask ___ your instructor to point out characteristics of grades on live animals.

May be photocopied for student use.

Optional: Visit	___	a stock show and identify market grades of lambs.
23. Study	___	the Information Sheet, objective 15.
Optional: Ask	___	your instructor to use a live animal to discuss qualifications for market grades.
Optional: Visit	___	a swine farm and observe factors that determine market grades.
24. Study	___	the Information Sheet, objective 16.
Optional: Visit	___	a meat packing facility to examine quality-indicating characteristics of the lean and cutability.
25. Study	___	the Information Sheet, objective 17.
Optional: Watch	___	a video on grading swine.
Optional: Talk	___	to a USDA extension agent and discuss qualifications for slaughter grades of swine.
Optional: Visit	___	a stock show and identify slaughter grades of swine.
26. Study	___	the Information Sheet, objective 18.
Optional: Talk	___	to a USDA extension agent and discuss qualifications for feeder grades of swine.
Optional: Visit	___	a stock show and identify feeder grades of swine.
Optional: Watch	___	a video on grading feeder swine.
27. Ask	___	your instructor for Handout 2.
28. Do	___	Assignment Sheet 3.

May be photocopied for student use.

29. **Stop**	___	and have your instructor evaluate your work from the Assignment Sheet. After your work has been evaluated, follow your instructor's recommendations.
30. **Study**	___	the Information Sheet, objective 20.
Optional: Watch	___	a video on poultry grades.
Optional: Talk	___	with a poultry grader or a USDA extension agent about poultry grading.
Optional: Go	___	to a grocery store and compare classes of chicken in the fresh and frozen meat departments.
31. **Study**	___	the Information Sheet, objective 21.
32. **Ask**	___	your instructor for Handout 3.
Optional: Visit	___	a supermarket and compare the prices of the different grades and weight classes of eggs.
Optional: Watch	___	a video on grading eggs.
33. **Study**	___	the Information Sheet, objective 22.
Optional: Talk	___	with a large commercial producer and a small producer about the egg market and compare methods of marketing.
34. **Take**	___	the posttest provided by your instructor. Have your instructor evaluate your completed test. After your test has been evaluated, follow your instructor's recommendations.

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WRITTEN TEST

MARKET GRADES AND CLASSES OF LIVESTOCK

D-2

Name _____ Score _____

OBJECTIVE 1

Choose the word or phrase to complete statements about market grades and classes of livestock. Write the letter of the correct answer in the blank.

____ 1. The standards to grade and class livestock were developed by

A. producers
B. the USDA
C. consumers
D. the congress

____ 2. Sheep grades include all of the following **EXCEPT**

A. Prime
B. Choice
C. Good
D. Commercial

____ 3. Yield grades

A. identify the percentage of lean meat
B. group livestock according to class
C. gauge the differences in palatability
D. classify feeder animals

____ 4. A vealer is

A. an animal that is intended for intensive feeding in preparation for slaughter
B. an animal that is intended for immediate slaughter
C. a calf under three months of age that is fattened and slaughtered
D. a young lamb that is fat enough for immediate slaughter

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____ 5. A feeder hog is

A. a pig that is fat enough for immediate slaughter
B. a pig that will be fed to gain additional weight prior to slaughter
C. a hog that is fat enough for immediate slaughter
D. a hog that will be fed to gain additional weight prior to slaughter

____ 6. A shearer is

A. a lamb intended for shearing and further finishing prior to slaughter
B. a lamb intended for shearing and then immediate slaughter
C. a yearling intended for shearing and further finishing prior to slaughter
D. a yearling intended for shearing then immediate slaughter

____ 7. A milker is

A. a cow intended for slaughter after milk production ceases
B. a cow that has stopped producing milk and is in line to be bred
C. a young calf that is still nursing
D. a cow sold for milking purposes

____ 8. Market grade refers to

A. the relative degree of excellence within a class
B. the grading of cattle according to the purpose for which an animal is to be used
C. the percentage of lean meat that can be obtained from the carcass
D. the relative degree of development of an animal

____ 9. Which of the following is **NOT** a quality grade of beef

A. Prime
B. Choice
C. Good
D. Utility

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____ 10. The grades that gauge flavor and tenderness are

A. palatability
B. yield
C. quality
D. market

OBJECTIVE 2

List factors that should be considered in selecting feeder cattle. List eight factors.

_____

_____

_____

_____

_____

_____

_____

_____

OBJECTIVE 3

Define approximate age ranges for cattle. Define the following terms.

1. vealers – _____

_____

2. calves – _____

_____

3. yearlings – _____

_____

4. two-year-olds – _____

_____

5. older cattle – _____

_____

May be photocopied for student use.

OBJECTIVE 4

State indicators of yield grades. State four indicators.

_____

_____

_____

_____

OBJECTIVE 5

Choose the word or phrase to complete statements about factors and standards used in the preliminary yield grade schedule for cattle. Write the letter of the correct answer in the blank.

____ 1. The lower the yield grade,

A. the higher the cutability
B. the lower the cutability
C. the lower the quality
D. the higher the quality

____ 2. Preliminary yield grade is based on the

A. warm-carcass weight
B. amount of kidney, pelvic, and heart fat
C. the rib eye area
D. thickness of fat over the rib eye

____ 3. An animal that produces a carcass with very high yields of boneless retail cuts and is very thickly muscled, with a high proportion of lean to bone is classified

A. yield grade 1
B. yield grade 2
C. yield grade 3
D. yield grade 4

____ 4. A steer that produces a carcass with intermediate yields of boneless retail cuts and is very thickly muscled, with a high proportion of lean to bone is classified

A. yield grade 2
B. yield grade 3
C. yield grade 4
D. yield grade 5

820

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____ 5. A cow that produces a carcass with high yields of boneless retail cuts, has a slightly thick covering of fat over the back and rump, and has slightly deep flanks is classified

A. yield grade 1
B. yield grade 2
C. yield grade 3
D. yield grade 4

____ 6. Warm carcass weight determines

A. the preliminary yield grade
B. the yield grade
C. the rib eye adjustment
D. the anticipated rib eye area

____ 7. The adjustment rate for comparing the actual rib eye area is to the anticipated rib eye area is

A. 0.1
B. 0.2
C. 0.3
D. 0.4

____ 8. The average amount of kidney, pelvic, and heart fat is

A. 1.5%
B. 2.5%
C. 3.5%
D. 4.5%

____ 9. For each 1% difference from the average in the amount of kidney, pelvic, and heart fat, the yield rate is adjusted by

A. 0.1
B. 0.2
C. 0.3
D. 0.4

____ 10. Yield grade 5 cattle are those that do not meet the minimum requirement for yield grade 4 because of

A. more muscle, less fat, but not enough to qualify
B. more fat, less muscle, or both
C. insufficient cod or udder
D. shallow flanks or smooth shoulders

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____ 11. The formula for calculating yield grade is preliminary yield grade

A. ± rib eye area, kidney, pelvic, and heart fat adjustment
B. ± rib eye area adjustment ± kidney, pelvic, and heart fat adjustment
C. ± rib eye area ± kidney, cod or udder, and heart fat adjustment
D. ± rib eye area adjustment + kidney, pelvic, and heart fat

____ 12. A 600 lb carcass has a no fat over the rib eye and a rib eye area that is 1 sq. in. less than the rib eye area needed for a 600 lb carcass. The percentage of kidney, pelvic, and heart fat is 2.5%. The estimated yield grade is

A. 1.7
B. 2.0
C. 2.1
D. 2.5

OBJECTIVE 6

Evaluated on Assignment Sheet 1.

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OBJECTIVE 7

Name qualifications for quality grades of cattle. Write your answer in the blanks.

1. Name three qualifications for quality.

_____

_____

_____

2. Name eight of the ten degrees of marbling.

_____

_____

_____

_____

_____

_____

_____

_____

3. Name five maturity classifications and the correlating approximate chronological age.

_____

_____

_____

_____

_____

May be photocopied for student use.

OBJECTIVE 8

Match slaughter grades of cattle to their descriptions. Write the letter of the correct answer in the blank.

A. Prime	G. Commercial
B. Sub-Standard	H. Standard
C. Cutter	I. U.S. No. 1
D. Canner	J. U.S. No. 2
E. Select	K. Choice
F. Utility	L. Superior

____ 1. Slaughter steers, heifers, and cows 30 to 42 months of age that have a fat covering over the crops, back, loin, rump, and ribs that tends to be moderately thick. The brisket, flanks, and cod or udder show a marked fullness and muscling is firm. Cattle under 30 months of age carry a slightly thick fat covering over the top. The brisket, flanks, and cod or udder appear moderately full and muscling is moderately firm.

____ 2. Steers, heifers, and cows over approximately 42 months of age that have a slightly thick fat covering over the back, ribs, loin, and rump and considerable patchiness frequently is evident about the tailhead. The brisket, flanks, and cod or udder appear to be moderately full and muscle is firm.

____ 3. Slaughter steers, heifers, and cows 30 to 42 months of age that have a fat covering that tends to be slightly thin with some fullness evident in the brisket, flanks, twist, and cod or udder, and muscling is firm. Cattle under 30 months of age have a thin fat covering which is largely restricted to the back and loin. The brisket, flanks, twist, and cod or udder are slightly full and muscling is slightly firm.

____ 4. Slaughter cattle where the degree of finish ranges from practically none in cattle under 30 months of age to very mature cattle which have only a very thin covering of fat.

May be photocopied for student use.

A. Prime	G. Commercial
B. Sub-Standard	H. Standard
C. Cutter	I. U.S. No. 1
D. Canner	J. U.S. No. 2
E. Select	K. Choice
F. Utility	L. Superior

____ 5. Slaughter steers and heifers 30 to 42 months of age that have a fat covering over the crops, back, ribs, loin, and rump that tends to be thick. The brisket, flanks, and cod or udder appear full and distended and the muscling is very firm. The fat covering tends to be smooth with only slight indications of patchiness. Steers and heifers under 30 months of age have a moderately thick, but smooth covering of fat which extends over the back, ribs, loin, and rump. The brisket, flanks, and cod or udder show a marked fullness and muscling is firm.

____ 6. Slaughter cattle that are inferior to the minimum specified for the Cutter grade.

____ 7. The minimum degree of finish required for slaughter steers, heifers, and cows varies throughout the range of maturity permitted in this grade from a very thin covering of fat for cattle under 30 months of age to a slightly thick fat covering, generally restricted to the back, loin, and rump for the very mature cattle. The crops are slightly thin and the brisket, flanks, and cod or udder indicate very slight fullness.

____ 8. Slaughter steers, heifers, and cows 30 to 42 months of age that have a fat covering primarily over the back, loin, and ribs which tends to be very thin. Cattle under 30 months of age have a very thin covering of fat which is largely restricted to the back, loin, and upper ribs.

May be photocopied for student use.

OBJECTIVE 9

Select true statements about the qualifications for feeder grades of cattle. Write an "X" in the blank before each correct answer.

____ 1. Feeder grades are based on frame size and thickness.

____ 2. Large-frame animals require a shorter time in the feedlot to reach a given grade than small-frame animals.

____ 3. There are four thickness specifications: No. 1, No. 2, No. 3, and No. 4.

____ 4. Medium frame feeder cattle are thrifty, have slightly large frames, and are slightly tall and long bodied for their age.

____ 5. No. 4 feeder cattle are thrifty animals which have less thickness than the minimum requirements specified for the No. 3 grade.

____ 6. Large frame feeder cattle are thrifty, have large frames, and are tall and long bodied for their age.

____ 7. Small frame feeder cattle are not thrifty, have small frames, are shorter bodied, and are not as tall as the minimum for the medium frame grade.

____ 8. No. 1 feeder cattle are thrifty and slightly thick throughout. They are slightly thick and full in the forearm and gaskin, showing rounded appearance through the back and loin with moderate width between the legs, both front and rear.

____ 9. Thickness is related to muscle-to-bone ratio at a given degree of fatness-to-carcass yield.

____ 10. Cattle that are narrow through the forequarters and have legs set close together are rated No. 1 or No. 2.

OBJECTIVE 10

Evaluated on Assignment Sheet 2.

May be photocopied for student use.

OBJECTIVE 11

List factors that determine market classes of sheep. List four factors that determine market classes of sheep.

_____

_____

_____

_____

OBJECTIVE 12

Match characteristics of age groups of sheep to their descriptions. Write the letter of the correct answer in the blank.

A. lamb	F. sheep
B. hothouse lamb	G. mature sheep
C. spring lamb	H. two-year old sheep
D. market lamb	I. three-year old sheep
E. yearling sheep	J. four-year old sheep

____ 1. a sheep between 36 and 48 months old that has its third pair of permanent incisor teeth

____ 2. a lamb that is usually less than three months of age at slaughter and that is born and marketed out of season

____ 3. any young ovine animal that does not classify as either hothouse lamb or spring lamb

____ 4. a sheep between 48 and 60 months old that has a full set of permanent incisor teeth

____ 5. a sheep that is more than two years of age

____ 6. a sheep between 24 and 36 months old that has its second pair of permanent incisor teeth

____ 7. a lamb ranging in age from three to seven months that arrives to the market in the spring

____ 8. a young sheep between one and two years of age

May be photocopied for student use.

OBJECTIVE 13

Name the criteria for slaughter grades of lamb. Write the answer in the blank.

1. Name three quality-indicating characteristics of the lean.

   _____

   _____

   _____

2. Name the grade that correlates to the cutability.

	Grade	Cutability (%)
a.	_____	48.4 to 49.6
b.	_____	47.1 to 48.3
c.	_____	51.0 or greater
d.	_____	47.0 or less
e.	_____	49.7 to 50.9

May be photocopied for student use.

OBJECTIVE 14

Match slaughter grades of lamb to their descriptions. Write the letter of the correct answer in the blank.

A. Prime
B. Choice
C. Standard
D. Good
E. Utility
F. Commercial

____ 1. Carcasses having the minimum conformation qualifications have slightly thin muscles throughout, are moderately narrow in relation to their length, and have slightly thin, tapering legs, and slightly narrow and thick backs and shoulders.

____ 2. Carcasses having minimum conformation qualifications tend to be thickly muscled throughout, are moderately wide and thick in relation to their length, and have moderately plump and full legs, moderately wide and thick backs, and moderately thick and full shoulders.

____ 3. Carcasses whose characteristics are inferior.

____ 4. Lamb carcasses having minimum conformation qualifications are slightly thick muscled throughout, they tend to be slightly wide and thick in relation to their length, and tend to have slightly plump and full legs, slightly wide and thick backs, and slightly thick and full shoulders.

OBJECTIVE 15

List qualifications for market grades of swine. List three qualifications for market grades of swine.

_____

_____

_____

May be photocopied for student use.

OBJECTIVE 16

Name the criteria for slaughter grades of swine. Write the answer in the blank.

1. Name three quality-indicating characteristics of the lean.

   _____

   _____

   _____

2. Name the grade that correlates to the cutability.

	Grade	Cutability (%)
a.	_____	54.4 to 57.3
b.	_____	54.3 or less
c.	_____	60.4 or greater
d.	_____	57.4 to 60.3

May be photocopied for student use.

OBJECTIVE 17

Match slaughter grades of swine to their descriptions. Write the letter of the correct answer in the blank.

A. U.S. Prime	F. U.S. No. 1
B. U.S. Choice	G. U.S. No. 2
C. U.S. Select	H. U.S. No. 3
D. U.S. Commercial	I. U.S. No. 4
E. U.S. Utility	J. U.S. No. 5

____ 1. Barrows and gilts in this grade will produce carcasses with acceptable lean quality and acceptable belly thickness and a high percentage of lean cuts. The width through the ham is nearly equal to the width through the shoulders and both are wider than the back. The back is slightly full, is well-rounded, and blends smoothly into the sides. The sides are moderately long and smooth. The rear flank is slightly full and its depth is less than the depth of the fore flank. The jowls are firm, slightly thick, and full.

____ 2. Barrows and gilts in this grade will produce carcasses with acceptable lean quality and acceptable belly thickness. They are fatter and less muscular with a lower carcass yield than the next higher class.

____ 3. Slaughter barrows and gilts in this grade will produce carcasses with acceptable lean quality, acceptable belly thickness, and a slightly high percentage of lean cuts. They are moderately thickly muscled in the hams, loins, and shoulders. The width through the shoulders is slightly more than the width through the hams. The back is moderately full and is slightly rounded, but with a slight break into the sides. The sides are slightly less than the depth of the fore flank. The jowls are moderately thick and full.

____ 4. Slaughter barrows and gilts in this grade will produce carcasses with acceptable lean quality, acceptable belly thickness, and a slightly low percentage of four lean cuts. They are slightly thin muscled in the hams, loins, and shoulders. The width through the shoulders is definitely greater than the width through the hams. The back is full and nearly flat, with a pronounced break into the sides. The sides are short and smooth. The rear flank is full and its depth is equal to the depth of the fore flank. The jowls are thick and full.

May be photocopied for student use.

A. U.S. Prime	F. U.S. No. 1
B. U.S. Choice	G. U.S. No. 2
C. U.S. Select	H. U.S. No. 3
D. U.S. Commercial	I. U.S. No. 4
E. U.S. Utility	J. U.S. No. 5

____ 5. Barrows and gilts typical of this grade will have a thin covering of fat. The sides are wrinkled and the flanks are shallow and thin. Barrows and gilts in this grade will produce carcasses with unacceptable lean quality and/or unacceptable belly thickness.

OBJECTIVE 18

Match feeder grades of swine to their descriptions. Write the letter of the correct answer in the blank.

A. U.S. Prime	F. U.S. No. 1
B. U.S. Choice	G. U.S. No. 2
C. U.S. Select	H. U.S. No. 3
D. U.S. Commercial	I. U.S. No. 4
E. U.S. Utility	J. U.S. No. 5

____ 1. Feeder pigs in this grade are moderately long and have moderately thick muscling throughout. Thickness of muscling is particularly evident in moderately thick and full hams and shoulders. The back usually appears slightly full and well-rounded. They usually present a well-balanced appearance.

____ 2. Feeder pigs typical of this grade are small for their age and appear unthrifty. They often have a rough, unkempt appearance, indicating the effects of disease or poor care. The hams and shoulders usually are thin and flat and taper towards the shanks. The back is thin and lacks fullness.

____ 3. Feeder pigs in this grade are long and have thick muscling throughout. Thickness of muscling is particularly evident in thick and full hams and shoulders. The hams and shoulders are thicker than the back, which is well-rounded. They usually present a well-balanced appearance.

May be photocopied for student use.

A.	U.S. Prime	F.	U.S. No. 1
B.	U.S. Choice	G.	U.S. No. 2
C.	U.S. Select	H.	U.S. No. 3
D.	U.S. Commercial	I.	U.S. No. 4
E.	U.S. Utility	J.	U.S. No. 5

____ 4. Feeder pigs typical of this grade are short and have thin muscling throughout. The hams are thin and rather flat, particularly in the lower parts toward the shanks. The back usually appears slightly flat and the width across the back is greater than the width across the belly.

____ 5. Feeder pigs in this grade are slightly short and have slightly thin muscling throughout. The hams and shoulders are slightly thin and flat and the back usually appears moderately full and thick.

OBJECTIVE 19 **Evaluated on Assignment Sheet 3.**

OBJECTIVE 20 **Name market classes, criteria, and grades of poultry.**

Part 1: Market Classes

Write the name that matches the description.

1. a young chicken under 13 weeks of age, of either sex, that is tender-meated with soft, pliable, smooth-textured skin and flexible breastbone cartilage

_____

2. an offspring of a cross between a purebred Cornish and a purebred Rock chicken of any carcass weight

_____

3. a young chicken, three to five months of age, of either sex, that is tender-meated with soft, pliable, smooth-textured skin and breastbone cartilage that is usually a little less flexible than that of a broiler or fryer

_____

May be photocopied for student use.

4. a mature female chicken, usually over ten months of age, with meat which is less tender than that of a roaster or roasting chicken and a nonflexible breastbone tip

_____

5. a young immature chicken, five to six weeks of age, weighing no more than two pounds ready-to-cook weight, from Cornish breeding or the offspring of a Cornish chicken crossed with another breed

_____

6. a mature male chicken with coarse skin, toughened and darkened meat, and hardened breastbone tip

_____

7. a surgically unsexed male, usually under eight months of age, that is tender-meated with soft, pliable, smooth-textured skin

_____

Part 2: USDA Poultry Grades

Write the grade that matches the description.

____ 1. abnormal, poorly fleshed, lacking in fat, with broken bones, discolorations and missing parts

____ 2. highest quality, complete without deformities

____ 3. moderate deformities, moderately fleshed, may be partially disjointed

Part 3: Criteria

Name five criteria for grading ready-to-cook poultry.

_____

_____

_____

_____

_____

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OBJECTIVE 21

Name grades, criteria, and classes of eggs.

1. Name the four USDA grades of eggs.

_____

_____

_____

_____

2. Name the six USDA weight classes.

_____

_____

_____

_____

_____

_____

3. Name the four criteria for grading eggs.

_____

_____

_____

_____

OBJECTIVE 22

Discuss marketing eggs. Write your answers in the blanks.

1. Why has egg production decreased since the early 1980's?

_____

_____

_____

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2. Describe how vertical integration within the egg industry works.

3. How are eggs sold that are not produced under vertical integration?

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Market Classes and Grades of Cattle

Classes

Slaughter Calf
Slaughter Steer
Slaughter Heifer
Slaughter Cow
Slaughter Bull
Feeder Steer
Feeder Heifer
Bullock

Slaughter grades

Quality		Yield	
% average dressing		% boneless retail cuts from round, loin, rib and chuck in carcass	
60-67	Prime	1	52.4-above
57-63	Choice	2	52.3-50.1
56-60	Good	3	50.0-47.8
53-58	Standard	4	47.7-45.5
52-60	Commercial	5	45.4-below
47-55	Utility		
43-52	Cutter		
38-46	Canner		

Feeder grades

Large Frame, No. 1
Large Frame, No. 2
Large Frame, No. 3
Medium Frame, No. 1
Medium Frame, No. 2
Medium Frame, No. 3
Small Frame, No. 1
Small Frame, No. 2
Small Frame, No. 3
Inferior

Preliminary yield grade schedule

Thickness of fat over ribeye	Preliminary yield grade
0	2.0
.2	2.5
.4	3.0
.6	3.5
.8	4.0
1.0	4.5

Ribeye area needed for various carcass weights

Warm carcass weight	Area of ribeye square inches
500	9.8
525	10.1
550	10.4
575	10.7
600	11.0
625	11.3
650	11.6
675	11.9
700	12.2
725	12.5
750	12.8

Factors and change in each required to make full yield grade change

Factor	Effect on yield grade	Approximate change required to make full yield grade change
1. Thickness of fat over ribeye (increase)	Decreases	4/10 of 1 inch
2. Percent of kidney (increase)	Decreases	5%
3. Carcass weight (increase)	Decreases	280 pounds
4. Area of rib eye (increase)	Increases	3 square inches

Class is the purpose for which an animal is to be used. It is determined by age, sex, sex condition and finish.

Quality grade refers to the quality of the meat (palatability). **Yield grade** refers to the amount of lean meat.

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FFA COMMERCIAL CATTLE GRADING CARD

Name _____ Mailing Address _____ Chapter _____

	Classes						Slaughter Grades										%	Feeder Grades							Score	
							Yield					Quality															
	Slaughter Calf	Slaughter Steer	Slaughter Heifer	Slaughter Cow	Feeder Steer	Feeder Heifer	1	2	3	4	5	Prime	Choice	Good	Standard	Commercial	Utility	Cutter	Canner	Dressing	Large	Medium	Small	1	2	3	Inferior		
1																												1
2																												2
3																												3
4																												4
5																												5
6																												6
7																												7
8																												8
9																												9
10																												10
11																												11
12																												12
13																												13
14																												14
15																												15
16																												16

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Market Hog Evaluation

contestant # _____ 4-H ____

CONTESTANT NAME _____ FFA ____

ADDRESS _____ CITY _____ STATE_____ ZIP _____ Adult___

		a											b		
For Computer use		1	2	3	4	5	6	7	8	9	10	11	12		
ACTUAL														Score	Total
HOG NO.	LENGTH	28.5	29.0	29.5	30.0	30.5	31.0	31.5	32.0	32.5	33.0	33.5	34.0		
	L.R.BACKFAT[c]	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7		
WEIGHT	LOIN AREA	4.0	4.2	4.4	4.6	4.8	5.0	5.2	5.4	5.6	5.8	6.0	6.2		
	%MUSCLE	46	48	50	51	53	54	55	56	57	58	60	62		
	GRADE							1	2	3	4	Util			

For Computer use		1	2	3	4	5	6	7	8	9	10	11	12		
HOG NO.	LENGTH	28.5	29.0	29.5	30.0	30.5	31.0	31.5	32.0	32.5	33.0	33.5	34.0		
	L.R.BACKFAT[c]	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7		
WEIGHT	LOIN AREA	4.0	4.2	4.4	4.6	4.8	5.0	5.2	5.4	5.6	5.8	6.0	6.2		
	%MUSCLE	46	48	50	51	53	54	55	56	57	58	60	62		
	GRADE							1	2	3	4	Util			

For Computer use		1	2	3	4	5	6	7	8	9	10	11	12		
HOG NO.	LENGTH	28.5	29.0	29.5	30.0	30.5	31.0	31.5	32.0	32.5	33.0	33.5	34.0		
	L.R. BACKFAT[c]	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7		
WEIGHT	LOIN AREA	4.0	4.2	4.4	4.6	4.8	5.0	5.2	5.4	5.6	5.8	6.0	6.2		
	%MUSCLE	46	48	50	51	53	54	55	56	57	58	60	62		
	GRADE							1	2	3	4	Util			

For Computer use		1	2	3	4	5	6	7	8	9	10	11	12		
HOG NO.	LENGTH	28.5	29.0	29.5	30.0	30.5	31.0	31.5	32.0	32.5	33.0	33.5	34.0		
	L.R.BACKFAT[c]	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7		
WEIGHT	LOIN AREA	4.0	4.2	4.4	4.6	4.8	5.0	5.2	5.4	5.6	5.8	6.0	6.2		
	%MUSCLE	46	48	50	51	53	54	55	56	57	58	60	62		
	GRADE							1	2	3	4	Util			

For Computer use		1	2	3	4	5	6	7	8	9	10	11	12		
HOG NO.	LENGTH	28.5	29.0	29.5	30.0	30.5	31.0	31.5	32.0	32.5	33.0	33.5	34.0		
	L.R.BACKFAT[c]	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7		
WEIGHT	LOIN AREA	4.0	4.2	4.4	4.6	4.8	5.0	5.2	5.4	5.6	5.8	6.0	6.2		
	%MUSCLE	46	48	50	51	53	54	55	56	57	58	60	62		
	GRADE							1	2	3	4	Util			

a This column also represents values less than those printed.

b This column also represents values greater than those printed.

c Last rib backfat, inches.

May be photocopied for student use.

"BALLPARK" ESTIMATES

Live Weight, lbs.:	200 - 265 (240)
Dressing %:	68 - 77 (72)
Average Backfat, in.:	0.70 - 2.00 (1.25)
Last Rib Backfat, in:	0.50 - 1.80 (1.10)
Fat Depth (10th Rib), in.:	0.70 - 2.00 (1.20)
Muscling Score:	Thick = 3 Average = 2 Thin = 1
Loin eye, sq. in.:	3.5 - 6.5 (4.6)
USDA Grade:	US No. 1 - US No. 4 (US No. 2)

Grade = (4 x Last Rib Backfat) - (1 x Muscling Score)

% Muscle:	45 - 61 (52)

% MUSCLE SHORT-CUT		
	Base	**Increments**
Percent Muscle	54.0	
Live Weight	230.0 lbs	± 10 lbs = ± 0.15%
Loin Eye	5.0 in	± 0 2 sq.in. = ± 0.25%
Fat Depth	1.0 in	± 0.1 in. = ± 0.90%

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U.S. Standards for Eggs

Specifications for each quality factor			
Quality Factor	**Grade AA**	**Grade A**	**Grade B**
Shell	Clean; unbroken; practically normal	Clean; unbroken practically normal	Clean to slightly stained[1]; unbroken; abnormal
Air Cell	1/8 inch or less in depth; unlimited movement and free or bubbly	3/8 inch or less in depth; unlimited movement and free or bubbly	Over 3/16 inch or less in depth; unlimited movement and free or bubbly
White	Clear Firm	Clear Reasonable firm	Weak and watery; small blood and meat spots present[2]
Yolk	Outline: slightly defined practically free from defects	Outline: slightly defined practically free from defects	Outline: slightly defined enlarged and flattened; clearly visible germ development, but no blood; other serious defects

[1] Moderately stained areas permitted (1/32 or surface, if localized; or 1/16, if scattered)
[2] If they are small (aggregating not more than 1/8 inch in diameter)

Standards for eggs with dirty or broken shells	
Dirty	Check
Unbroken, adhering dirt or foreign material, prominent stains, moderate stained areas in excess of Grade B	Broken or cracked shell but membranes are intact, not leaking[3]

[3] A leaker has a broken or cracked shell and membranes, and contents are leaking or free to leak.

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LAP SHEET	*POULTRY AND EXOTIC LIVESTOCK*	**D-3**

Check the blank as you complete each step.

1. Take	___ the pretest provided by your instructor. Have your instructor evaluate your completed test. After your test has been evaluated, follow your instructor's recommendations.
2. Read	___ the introduction, unit objective, and specific objectives.
3. Do	___ the focus assignments.
4. Stop	___ and have your instructor evaluate your work from the focus assignment. After your work has been evaluated, follow your instructor's recommendations.
5. Study	___ the Information Sheet, objective 1.
Optional: Interview	___ individuals about poultry consumption.
Optional: Visit	___ a grocery store and identify the various poultry products available.
Optional: Read	___ OSU publication CR-204 *Broiler Industry Overview* and/or USDA publications relating to poultry trends and production.
6. Study	___ the Information Sheet, objective 2.
Optional: Read	___ trade journals such as *Poultry Digest, Turkey World, Broiler Industry, Poultry International,* and *Egg Industry.*
7. Study	___ the Information Sheet, objective 3.
Optional: Evaluate	___ photos/pictures of poultry.

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8. **Do**	___	Assignment Sheet 1.
9. **Stop**	___	and have your instructor evaluate your work from the Assignment Sheet. After your work has been evaluated, follow your instructor's recommendations.
10. **Do**	___	Assignment Sheet 2.
11. **Stop**	___	and have your instructor evaluate your work from the Assignment Sheet. After your work has been evaluated, follow your instructor's recommendations.
12. **Study**	___	the Information Sheet, objective 6.
Optional: Look	___	at catalogs and/or sales information from hatcheries.
Optional: Visit	___	a commerical hatchery.
13. **Do**	___	Assignment Sheet 3.
14. **Stop**	___	and have your instructor evaluate your work from the Assignment Sheet. After your work has been evaluated, follow your instructor's recommendations.
15. **Study**	___	the Information Sheet, objectives 8-12.
Optional: Examine	___	different types of poultry feeds.
Optional: Review	___	the grades of poultry and the grades and classes of eggs.
Optional: Research	___	a company involved in the marketing of poultry.
Optional: Read	___	trade journals relating to poultry.
Optional: Write	___	to the National Turkey Federation.

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16. Study	___	the Information Sheet, objective 13.
Optional: Visit	___	a facility which has ducks or geese.
17. Study	___	the Information Sheet, objective 14.
Optional: Candle	___	eggs.
18. Study	___	the Information Sheet, objective 15.
Optional: Visit	___	a captive game bird facility.
19. Study	___	the Information Sheet, objective 16.
Optional: Write	___	to the American Rabbit Breeders Association.
20. Study	___	the Information Sheet, objective 17.
Optional: Write	___	to the Llama Association of North America.
Optional: Read	___	OSU Extension Facts F-9122 *Some General Information for the Potential Llama Owner.*
21. Study	___	the Information Sheet, objective 18.
Optional: Read	___	OSU Extension Facts F-3988 *Ostrich Production* and/or ostrich and emu magazines such as *The Ostrich News, Exclusively Ostrich,* and *The Ratite Trader.*
Optional: Visit	___	an ostrich or emu operation.
22. Study	___	the Information Sheet, objective 19.
Optional: Write	___	to the American Honey Producers Association.

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Optional: Read	___	journals on beekeeping such as *American Bee Journal*, *Bee Culture*, *Bee Science*, and *The Speedy Bee*.
Optional: Visit	___	a beekeeping facility.
23. Study	___	the Information Sheet, objective 20.
Optional: Read	___	OSU Extension Facts No. F-9201 *Getting Started in Aquaculture* and F-9002 *Catfish Farming*.
24. Study	___	the Information Sheet, objectives 21-22.
25. Do	___	Assignment Sheet 4.
26. Stop	___	and have your instructor evaluate your work from the Assignment Sheet. After your work has been evaluated, follow your instructor's recommendations.
27. Do	___	Assignment Sheet 5.
28. Stop	___	and have your instructor evaluate your work from the Assignment Sheet. After your work has been evaluated, follow your instructor's recommendations.
29. Do	___	Assignment Sheet 6.
30. Stop	___	and have your instructor evaluate your work from the Assignment Sheet. After your work has been evaluated, follow your instructor's recommendations.
31. Study	___	the Information Sheet, objective 26.
32. Take	___	the posttest provided by your instructor. Have your instructor evaluate your completed test. After your test has been evaluated, follow your instructor's recommendations.

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WRITTEN TEST

POULTRY AND EXOTIC LIVESTOCK D-3

Name _____ Score _____

OBJECTIVE 1

Choose the word or phrase to complete statements about poultry trends and production. Write the correct letter in the blanks.

____ 1. Since the late 1960s, the consumption of eggs per person has

A. increased
B. decreased
C. stayed the same
D. stabilized

____ 2. Since the late 1960s, the consumption of poultry meat has

A. increased
B. decreased
C. stayed the same
D. stabilized

____ 3. The majority of poultry operations are

A. limited partnerships
B. incorporated
C. vertically integrated
D. sole proprietorships

____ 4. The poultry industry tends to be regionalized with heavy concentrations in the

A. North
B. Midwest
C. Northwest
D. Southeast

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____ 5. The number of farms producing poultry products has decreased and the size of poultry farms has

A. increased
B. decreased
C. stayed the same
D. stabilized

____ 6. Compared to other meat products, the price of poultry is relatively

A. more expensive
B. less expensive
C. about the same
D. twice as expensive

OBJECTIVE 2

List types of poultry enterprises. Write your answers in the blanks.

1. _____
2. _____
3. _____
4. _____

OBJECTIVE 3

Discuss criteria for selecting poultry. Write your answers in the blanks.

1. What three ways may poultry be selected?

_____

_____

_____

2. List four characteristics of pullets for egg production.

_____

_____

_____

_____

May be photocopied for student use.

3. List three selection criteria for broilers.

_____

_____

_____

4. List three selection criteria for turkeys.

_____

_____

_____

OBJECTIVE 4 **Evaluated on Assignment Sheet 1.**

OBJECTIVE 5 **Evaluated on Assignment Sheet 2.**

OBJECTIVE 6 **List sources for poultry.** Write your answers in the blanks.

1. _____
2. _____
3. _____
4. _____

OBJECTIVE 7 **Evaluated on Assignment Sheet 3.**

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OBJECTIVE 8

Discuss poultry housing and equipment. Write your answers in the blanks.

1. When planning a new poultry facility, what criteria should be evaluated?

   _____

   _____

   _____

2. List four basic requirements of poultry housing.

   _____

   _____

   _____

   _____

3. List three characteristics the poultry producer should pay special attention to.

   _____

   _____

   _____

May be photocopied for student use.

OBJECTIVE 9

Choose the word or phrase to complete statements about poultry feed and flock health plans. Write the correct letter in the blank.

____ 1. Poultry rations must supply the necessary carbohydrates, minerals, vitamins, water, and

A. energy
B. sugar
C. protein
D. fat

____ 2. Most of poultry ration is made up of

A. carbohydrates
B. fats
C. minerals
D. protein

____ 3. A preventive management program should include sanitation, vaccinations, control of external and internal parasites, and

A. cost saving measures
B. control of disease outbreaks
C. vaccinations every three years
D. limit breeding

OBJECTIVE 10

Discuss marketing poultry. Write your answers in the blanks.

1. How are most poultry products produced?

_____

2. What is included in the price consumers pay?

_____

_____

_____

3. Who determines the grades and classes of poultry?

_____

May be photocopied for student use.

OBJECTIVE 11

Select management practices for chickens: meat, egg, and breeding production. Place an "X" in front of correct answers.

MEAT

_____ 1. A practical program for raising broilers is the all-in, all-out system, meaning that only one age of broilers is on the farm at a time.

_____ 2. The broiler operation should be isolated.

_____ 3. Keep accurate records of the operation.

_____ 4. Market broilers at 16 weeks of age.

_____ 5. Broilers are generally marketed between 6 and 8 weeks of age.

_____ 6. A practical program is to have several different ages of broilers on the farm at a time.

_____ 7. Chickens raised for meat production are usually kept in confinement.

_____ 8. Chickens raised for meat are often free range.

EGG

_____ 9. Laying flocks may be housed in open-floor systems or in caged systems.

_____ 10. Lighting is essential for laying flocks.

_____ 11. Keep all laying hens for at least one year.

_____ 12. Provide an adequate number of nests and keep the nests clean.

_____ 13. Provide one nest for every three hens.

_____ 14. Clean and disinfect houses before moving pullets into them.

_____ 15. Laying flocks should be kept in cages only.

_____ 16. Cull unproductive and inferior pullets.

_____ 17. Keep accurate records of the operation.

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BREEDING

____ 18. Breeding flocks consist of about 10% as many males as females.

____ 19. Vaccination programs and blood-testing must be done on breeding flock.

____ 20. Breeding flocks consist of about 50% male and 50% female.

____ 21. Keep accurate records of the operation.

____ 22. Management practices will vary according to the purpose of the breeding operation.

OBJECTIVE 12

Select management practices for turkeys. Write an "X" in front of correct answers.

____ 1. Breeding stock should be tested for diseases.

____ 2. Brooder guards should be used the first week to keep poults near the heat source.

____ 3. Clean feeders and waterers once a week.

____ 4. Poults should be encouraged to eat and drink.

____ 5. Temperature should be kept at 95° F. for about the first two weeks and then lowered 5° F. until heat is no longer needed.

____ 6. Do not feed poults when they first arrive.

____ 7. Thoroughly clean and disinfect the brooder house before the poults arrive.

____ 8. Keep temperature at 105° for the first month.

____ 9. Spread fresh litter on the floor, litter should be covered with rough-surfaced paper the first few days.

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_____ 10. Poults may be moved to confinement houses at six to eight weeks of age.

_____ 11. Do not place turkeys on range.

_____ 12. Provide ventilation without drafts.

_____ 13. Clean feeders and waterers regularly.

OBJECTIVE 13

Select management practices for geese and ducks. Write an "X" in front of correct answers.

_____ 1. Ducks can be raised in confinement or in a growing house which has an exercise area that includes water for swimming or wading.

_____ 2. Pelleted feeds are best for ducks.

_____ 3. The breed should be chosen according to the use.

_____ 4. Only brood ducklings and goslings naturally.

_____ 5. Young ducklings and goslings should not be let out in the rain.

_____ 6. The amount of space and type of facility required for geese and ducks depends on the objectives of the operation.

_____ 7. Use wire flooring for goslings.

_____ 8. Fresh water which is easily accessible should be available at all times.

_____ 9. Geese must have access to pasture.

_____ 10. Ducklings and goslings can be brooded either naturally or artificially.

_____ 11. Let young ducklings and goslings out in the rain.

_____ 12. Ducks and geese grow faster than chickens and will require heat for a shorter length of time.

_____ 13. Ducks should not be fed pelleted feeds.

_____ 14. Ducklings can have wire or litter flooring.

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____ 15. Litter should be used for goslings: cover the litter with rough paper the first few days.

____ 16. Ducks and geese should be protected from predators.

____ 17. The breed should be chosen according to the facility available.

____ 18. Ducks and geese require a longer brooding time than chickens.

OBJECTIVE 14

State guidelines for handling eggs. Write your answers in the blanks.

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

May be photocopied for student use.

OBJECTIVE 15

Choose the word or phrase to complete statements about captive game bird production. Write the correct letter in the blank.

____ 1. Game birds raised in captivity include quail, pheasants, guinea fowl, and

A. chukar partridge
B. dove
C. cranes
D. falcons

____ 2. The Bobwhite quail is raised as a game bird for hunting preserves, for release in conservation areas, and

A. for feathers
B. for meat purposes
C. for sale as pets
D. for research purposes

____ 3. Because of their size, chukar partridges have the potential to become

A. easily raised in captivity
B. a specialty meat
C. used for hunting preserves
D. restaurant specialty items

OBJECTIVE 16

Choose the word or phrase to complete statements about rabbit production. Write the correct letter in the blank.

____ 1. Rabbits are raised for all of the following except

A. meat
B. animal feeds
C. wool
D. research

____ 2. The major commercial purpose of rabbit raising is

A. meat
B. research
C. hobbies and pets
D. show or exhibition

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____ 3. Angora rabbits are raised for

A. wool
B. research
C. meat
D. laboratory use

____ 4. Rex rabbits are raised for

A. meat
B. research
C. wool
D. fur

____ 5. Rabbits used for research include the Dutch and

A. Rex
B. Angora
C. New Zealand White
D. Californian

____ 6. Rabbits raised for meat include the New Zealand White and

A. Californian
B. Rex
C. Angora
D. Dutch

____ 7. The current profitability and size of rabbit operations is limited because of the intensive labor requirements, disease problems, and

A. high feed costs
B. large initial financial investment
C. unstable markets
D. lack of breeding potential

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OBJECTIVE 17

Choose the word or phrase to complete statements about llama production. Write the correct letter in the blank.

____ 1. In the United States, llamas are used for breeding, cart pulling, hobby or pet, pack animals, wool production, and

A. research
B. riding
C. meat
D. show or exhibition

____ 2. Llamas eat

A. grain and grass
B. meat
C. fiber
D. both meat and grass

____ 3. Llamas are members of the family of

A. cattle
B. equines
C. camels
D. goats

____ 4. Llamas are native to

A. Asia
B. South America
C. North America
D. Central America

____ 5. Llamas are herd animals and will thrive better if placed

A. alone
B. with cattle
C. with other llamas
D. close to humans

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OBJECTIVE 18

Choose the word or phrase to complete statements about ostrich and emu production. Write the correct letter in the blank.

____ 1. Ostrich and emu production in the United States is a(n)

A. established agricultural enterprise
B. relatively new agricultural enterprise
C. unprofitable business
D. strictly hobby operation

____ 2. The marketing of ostrich and emu chicks is primarily for

A. pet purposes
B. raising for meat
C. breeding stock
D. raising for leather

____ 3. Ostrich and emu production can provide products for the leather industry, meat industry, and

A. fashion industry
B. dairy industry
C. research
D. cattle industry

____ 4. General guidelines for facility requirements include approximately

A. 10 acres per breeding pair
B. ⅛ acre per breeding pair
C. 5 acres per breeding pair
D. ½ acre per breeding pair

May be photocopied for student use.

OBJECTIVE 19

Choose the word or phrase to complete statements about beekeeping. Write the correct letter in the blank.

____ 1. The primary product of beekeeping is

A. beeswax
B. bee venom
C. bee pollen
D. honey

____ 2. Bees should have access to an abundance of nectar-secreting plants and

A. pollen-bearing plants
B. water
C. grass
D. trees

____ 3. A colony of bees is comprised of worker bees, drones, and

A. the king bee
B. the king and queen bee
C. the queen bee
D. several queen bees

____ 4. Honey is used in medicine, pharmacy, and

A. fiber products
B. cosmetic products
C. pesticide products
D. cleaning products

____ 5. Honey bees manufacture substances such as beeswax, bee pollen, bee venom, and

A. bee juice
B. royal pollen
C. honey jelly
D. royal jelly

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OBJECTIVE 20

Choose the word or phrase to complete statements about aquaculture. Write the correct letter in the blank.

____ 1. Types of aquaculture environments include warmwater aquaculture, coldwater aquaculture, and

A. river aquaculture
B. pond aquaculture
C. mariculture
D. confinement aquaculture

____ 2. Types of aquaculture enterprises include food-fish production, broodfish production, fingerling production, fee-fish production/operation, baitfish production, ornamental or hobby fish production, and

A. egg production
B. fillet production
C. release production
D. stocker production

____ 3. Major aquaculture species include baitfishes/feeder fishers, channel catfish, and

A. tilapia
B. trout and salmon
C. shrimp
D. hybrid striped bass

____ 4. Secondary aquaculture species include all of the following except

A. trout and salmon
B. crayfish
C. tilapia
D. bass

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OBJECTIVE 21

Discuss exotic animal production. Write your answers in the blanks.

1. What does exotic animal production include?

   _____

   _____

2. Why can exotic animal production be a risky financial venture?

   _____

   _____

3. What factors attributed to successful businesses may be limited for exotic animal production?

   _____

   _____

4. In order to be successful, exotic animal production must do what?

   _____

   _____

5. Exotic animals are often initially priced at what level?

   _____

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OBJECTIVE 22

Discuss markets and resources for exotic animals. Write your answers in the blanks.

1. Are markets for exotic animals clearly identified?

   _____

2. Marketing of exotic animals can be done by doing what to the consumers or retailers desiring the product?

   _____

   _____

3. How can consumers be made aware of exotic animals?

   _____

   _____

4. What are resources for the exotic animal producer?

   _____

   _____

   _____

OBJECTIVE 23

Evaluated on Assignment Sheet 4.

OBJECTIVE 24

Evaluated on Assignment Sheet 5.

OBJECTIVE 25

Evaluated on Assignment Sheet 6.

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OBJECTIVE 26

List sources of funding and financing for exotic animal production. Write your answers in the blanks.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____

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IS THIS AGRICULTURE?

Ostrich and emu farms were a rarity only several years ago, but today are becoming increasingly common. Alternative agricultural enterprises, such as ostrich and emu production, have become more common. As economic conditions change, farmers are willing to look at nontraditional opportunities in agriculture. However, before an individual goes into a new business, he or she must do some preliminary research. Below are several questions to consider:

1. Is it technically feasible on your farm?

   It is physically possible to produce the enterprise on your farm? Do you have appropriate climate, soils, water, equipment, and labor?

2. Is it economically feasible?

   Can you produce the enterprise at a profit? Do you know, or can you estimate with reasonable certainty, the expected costs of production for the enterprise?

3. Can you get needed financing?

   Many lenders know little about enterprises which are considered alternatives. Be prepared to give detailed information and a business plan for the enterprise.

4. Is there a market available, and do you have the necessary marketing skills?

   It is very important to plan for marketing before you plan for production. Many alternative enterprises do not have as well established markets as do traditional enterprises. However, innovative market planning can often find both direct and indirect marketing opportunities for alternative enterprises. Direct marketing refers to selling commodities directly to consumers. Methods of direct marketing for many alternative agricultural enterprises include roadside stands, farmers' markets, and pick-your-own operations. Indirect marketing of alternative enterprises usually means dealing with packing houses, brokers, wholesalers, and retail outlets.

5. Can you stand the risks?

   Any new enterprise involves risk. Major portions of the risk associated with alternative agricultural enterprises are price and yield variability. A useful way to evaluate the risk associated with an enterprise is to estimate the minimum returns or maximum losses that you can stand. Look at a worse case scenario and see if you can stand it.

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Another source of risk relates to an individual's liability if he or she invites customers into the direct marketing operation. An individual may be liable for injuries experienced by customers in such circumstances. An individual who is considering direct marketing of an alternative enterprise should check with an insurance agent and attorney about any liability insurance that should be considered.

6. What support services are needed?

   If you are considering an alternative agricultural enterprise, you should recognize that needed support services may not exist in your area. A lack of support services does not necessarily mean that you should avoid the enterprise. However, you should consider what services are not locally available, and where you will have to go to get them, or how you will get along without them. Such support services include marketing services, special equipment and supplies, and information services.

7. How does the enterprise match up with your personal interests?

   Do your personal interests match up with the activities that you will have to carry out if you become involved with an alternative agricultural enterprise? For example, if managing temporary labor and dealing with city produce brokers is undesirable to you then there are some alternative enterprises you should avoid. Do you have the time and are you willing to give up that time to devote to an alternative enterprise?

Adapted from Oklahoma State University Cooperative Extension Service Fact Sheet No. 869 *Taking Advantage of Alternative Agriculture Opportunities.*

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LAP SHEET	*LIVESTOCK PRICE TRENDS AND CYCLES*	**D-4**

Check the blank as you complete each step.

1. **Take**	___ the pretest provided by your instructor. Have your instructor evaluate your completed test. After your test has been evaluated, follow your instructor's recommendations.
2. **Read**	___ the introduction, unit objective, and specific objectives.
3. **Do**	___ the focus assignments.
4. **Stop**	___ and have your instructor evaluate your work from the focus assignment. After your work has been evaluated, follow your instructor's recommendations.
5. **Stu**	___ the Information Sheet, objective 1.
Optional: Read	___ USDA publications relating to livestock price trends and cycles.
Optional: Watch	___ or listen to farm reports giving livestock prices.
Optional: Interview	___ friends and family members about their consumption of meat and changes in their diets over the years.
Optional: Read	___ OSU Extension Facts No. F-488, *Meat Trends: Consumption, Prices, and Production Costs*, F-497, *Price Spreads for Beef and Pork*, F-511, *A Profile of Food Consumption Trends and Changing Market Institutions*, CR-507, *U.S. Meat and Poultry Demand*, and/or CR-528, *Beef-By-Product Values: Trends and Current Issues*.

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6. **Study**	___	the Information Sheet, objective 2.
Optional: Draw	___	supply and demand curves for various scenarios.
Optional: Write	___	a report on changes in consumer demand for a specific commodity, for example, beef or poultry.
Optional: Give	___	a brief (2-3 minute) oral presentation on your report.
7. **Study**	___	the Information Sheet, objectives 3 and 4.
Optional: Read	___	OSU Extension Facts No. 506, *Seasonal Cattle Feeding Profits*, and/or No. 521, *Cattle Marketing Plan.*
Optional: Read	___	USDA publications relating to livestock price trends and cycles.
8. **Do**	___	Assignment Sheet 1.
9. **Stop**	___	and have your instructor evaluate your work from the Assignment Sheet. After your work has been evaluated, follow your instructor's recommendations.
10. **Do**	___	Assignment Sheet 2.
11. **Stop**	___	and have your instructor evaluate your work from the Assignment Sheet. After your work has been evaluated, follow your instructor's recommendations.
12. **Study**	___	the Information Sheet, objective 7.
13. **Take**	___	the posttest provided by your instructor. Have your instructor evaluate your completed test. After your test has been evaluated, follow your instructor's recommendations.

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WRITTEN TEST

LIVESTOCK PRICE TRENDS AND CYCLES

D-4

Name _____ Score _____

OBJECTIVE 1

Choose the word or phrase to complete statements about livestock price trends and cycles. Write the letter of the correct answer in the blank.

____ 1. The general trend in livestock prices since the 1960s has been

A. downward
B. upward
C. stable
D. variable

____ 2. The per person consumption of red meat has

A. stabilized
B. decreased
C. stayed the same
D. increased

____ 3. The per person consumption of fish and poultry has

A. stabilized
B. decreased
C. stayed the same
D. increased

____ 4. The market share of poultry has

A. stabilized
B. decreased
C. stayed the same
D. increased

____ 5. The price of poultry compared to other meat products is relatively

A. less expensive
B. more expensive
C. the same
D. mixed

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____ 6. Production costs for poultry compared to most other meat products are

A. higher
B. lower
C. the same
D. mixed

____ 7. Seasonal price patterns result from changes in

A. packaging
B. the stock market
C. production and consumption
D. advertising

____ 8. Seasonal price patterns are not as evident as they used to be because of factors such as year-round finishing of cattle and lambs, year-round farrowing of sows in confinement, and

A. large grocery stores
B. use of light and hormones to control estrus in livestock
C. diverse consumer demands
D. advertising

____ 9. Price cycles are not as significant as in previous years because of factors such as production operations for many livestock animals have increased in size, confinement production has increased, less seasonal production of livestock, and

A. large grocery stores
B. increased importation of livestock products
C. diverse consumer demands
D. more year-round births of livestock

____ 10. The futures market gives an indication of commodities

A. past prices
B. current prices
C. price projections
D. consumption forecasts

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OBJECTIVE 2

Discuss supply and demand. Write your answers in the blanks.

1. What does the demand curve illustrate?

_____

_____

2. What does elastic demand mean?

_____

_____

3. What does inelastic demand mean?

_____

_____

4. What can cause a shift in the demand curve?

_____

_____

5. What does a supply curve illustrate?

_____

_____

6. What is the intersection of the demand and supply curves?

_____

7. What are factors that affect the supply of agricultural products?

_____

_____

_____

_____

May be photocopied for student use.

OBJECTIVE 3

Select true statements about factors affecting price variations. Place an "X" before correct statements.

____ 1. Short-term changes are caused by the decision of large numbers of producers to sell.

____ 2. Neither cyclical nor seasonal variations are as evident as they used to be.

____ 3. Long-term trends are those which affect prices over a long period of time, usually caused by economic conditions.

____ 4. Both cyclical and seasonal variations are more evident than they used to be.

____ 5. Short-term changes are the day-to-day variations in livestock prices.

____ 6. Cyclical trends are caused by short-term changes.

____ 7. Seasonal variations are caused by changes in production and consumption during the year.

____ 8. Factors that affect short-term changes include weather, transportation problems, strikes, uncertainty about government policies, and changes in the stock market.

____ 9. Long-term trends are those which affect prices over a short period of time.

____ 10. Cyclical trends are caused by the price cycles of livestock.

May be photocopied for student use.

OBJECTIVE 4

Match various types of livestock to times of the year when it would be most profitable to market and/or purchase them. Write the letter of the correct answer in the blank. Answers may be used more than once.

A. Slaughter steers, Prime, Choice, and Good
B. Slaughter steers, other grades
C. Slaughter heifers
D. Cows
E. Feeder calves
F. Grass-finished lambs
G. Fed lambs
H. Feeder lambs
I. Market barrows and gilts
J. Sows
K. Feeder pigs

____ 1. Highest prices are from June through August.

____ 2. Highest prices are from December to April.

____ 3. Lowest markets are in November, December, March, and April.

____ 4. Highest prices are from February to May.

____ 5. Lowest prices are from December to February.

____ 6. Lowest prices are from May through September.

____ 7. Highest prices are in June to October.

____ 8. Lowest prices are in July.

____ 9. Highest prices are from February through April.

____ 10. Lowest prices are in December.

____ 11. Highest prices are in April and September.

____ 12. Highest prices are in May and June.

____ 13. Highest prices are from March to May.

____ 14. Lowest prices are from August to December.

____ 15. Lowest prices are in June and from October to February.

May be photocopied for student use.

____ 16. Lowest prices are in December.

____ 17. Highest prices are from August to October.

____ 18. Lowest prices are from October to February.

____ 19. Lowest prices are from December to March.

____ 20. Highest prices are in January and August.

____ 21: Highest prices are from March to July.

____ 22. Lowest prices are from September through November.

OBJECTIVE 5 **Evaluated on Assignment Sheet 1.**

OBJECTIVE 6 **Evaluated on Assignment Sheet 2.**

OBJECTIVE 7 **Determine ways in which progressive livestock producers use market changes.** Place an "X" in front of correct answers.

____ 1. To speculate in the futures market

____ 2. Making management decisions

____ 3. Planning buying and selling operations

____ 4. Determining labor requirements

____ 5. Using the futures market for risk management

May be photocopied for student use.

ANIMAL SCIENCE

READING SKILLS

CIM

WRI

UNITS OF INSTRUCTION	Gain factual information	Distinguish fact, opinion and inference	Recognize stereotyping and bias	Recognize propaganda	Analyze cause and effect	Draw conclusions	Make generalizations	React to written material	Apply word analysis techniques	Select useful resources	Locate resources	Find materials in library	Use standard references	Use in-book reference tools	Use audiovisual media	Use computer data base	Use magazines and newspapers	Interpret forms and records	Follow written instructions	Interpret graphics and symbols	Use content area vocabulary	Interpret abbreviations/acronyms	Read aloud	Use standard grammar and correct spelling, punctuation, and capitalization	State ideas clearly	Use complete sentences	Develop preliminary outline	Use topic sentences	Use introductory/closing paragraphs	Compose reports	Compose essays	Proofread and edit	Construct graphics and symbols
1. Safety	●				●	●											●							●	●								●
2. Careers	●									●		●			●		●							●	●	●	●						
3. Private and Governmental Agencies, Their Services and Programs										●		●	●				●			●				●	●	●	●			●	●		
4. Selecting and Breeding Livestock	●					●														●				●	●	●						●	●
5. Reproductive Organs	●						●			●		●	●	●										●	●					●			
6. Artificial Insemination																		●		●													
7. Fertility and Pregnancy Testing																		●		●													●
8. Birth Assistance																																	
9. Biotechnology: Embryo Transfer and Gene Splicing										●		●					●							●	●								
10. Animal Health Care																		●		●													
11. Livestock Diseases and Parasites	●									●		●									●												
12. Nutrition, Feeds, and Additives	●					●				●		●				●			●	●				●	●	●					●		●
13. Vaccination and Drugs	●																		●	●													
14. Dehorning, Docking, and Castration																			●	●													
15. Hoof Trimming, Shearing, and Animal Identification																			●	●													
16. Livestock Price Trends and Cycles	●					●	●				●						●							●	●								
17. Marketing Livestock																				●													
18. Market Grades and Classes of Livestock	●									●	●	●	●				●							●	●								
19. Poultry and Exotic Livestock																	●		●					●	●	●							

C BASIC SKILLS DOCUMENTATION MATRI

'ING SKILLS

MATH SKILLS

| Research | | | | | Functional Writing | | | | | | | Operations and Calculation | | | | | | | | | | | | Math Applications | | | | | | | | | | | | | | Data Analysis and Display | | | | | | | | | | | | | |

RIX

SCIENCE SKILLS

94-010787

| Functional Math | | |

ORAL COMMUNICATION SKILLS

INTERPERSON S

	Oral Presentation									Listening				Interactive Communication								General Relating								
UNITS OF INSTRUCTION	Make informative presentations	Make persuasive presentations	Present personal opinion/viewpoint	Use good speaking techniques	Select/use words effectively	Use effective body language	Present approriate appearance	Integrate audio and/or visual materials in oral presentations	Adapt presentation to specific audience	Apply active listening skills	Distinguish fact, opinion, and inference	Draw conclusions/make generalizations	Analyze/identify point of view	Give/follow oral directions	Apply questioning techniques	Conduct/receive interviews	Analyze/apply nonverbal communication	Work effectively in a group	Communicate with clients/customers/patients	Communicate with co-workers	Communicate with supervisors	Communicate with professional colleagues/ associates	Apply telephone etiquette	Investigate/apply communication process models	Analyze/apply nonverbal communication	Investigate/apply cross-cultural communication	Interact with co-workers	Interact with supervisors	Interact with clients/customers/patients	Interact with professional colleagues/associates	Interact with family/friends	Participate in group activities	Participate in industrial relations/functions
1. Safety	●			●				●																							
2. Careers	●			●	●	●	●			●						●															
3. Private and Governmental Agencies, Their Services and Programs	●			●												●															
4. Selecting and Breeding Livestock																															
5. Reproductive Organs																															
6. Artificial Insemination																															
7. Fertility and Pregnancy Testing																															
8. Birth Assistance																															
9. Biotechnology: Embryo Transfer and Gene Splicing	●			●																											
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15. Hoof Trimming, Shearing, and Animal Identification																															
16. Livestock Price Trends and Cycles																															
17. Marketing Livestock																															
18. Market Grades and Classes of Livestock																															
19. Poultry and Exotic Livestock	●			●	●	●	●	●																							
* Use this line for entering your state or local codes for graduation requirements or learner outcomes.																															

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SONAL OR RELATING SKILLS

CREATIVE THINKING/ PROBLEM SOLVING SKILLS

EMP

Participate in group activities	Participate in industrial relations/functions	Identify personal values/attitudes	Apply information to life experiences	Identify values/attitudes	Identify needs/drives	Select/apply appropriate behavior	Investigate/identify personal styles	Investigate/identify group/corporate climate	Give/receive feedback	Identify hidden purposes	Investigate/apply group dynamics	Control undesirable/inappropriate behavior	Resolve conflicts	Clarify goals/objectives	Devise "win/win" situations	Build consensus	Generate ideas	Present point of view	Analyze/apply leadership styles	Analyze/apply management styles	Obtain confidence of others	Develop esteem in self/others	Persuade others	Analyze/apply motivation techniques	Provide positive coaching	Collect/record information	Identify critical elements/issues	Define a problem	Identify underlying causes	Apply a problem-solving model	Analyze/synthesize information	Identify/analyze underlying assumptions	Draw conclusions	Predict results/outcomes	Identify/evaluate consequences	Identify/develop alternatives	Evaluate alternatives	Select an alternative	Devise a solution	Create a finished product	Apply intuitive/creative thinking processes	Transfer knowledge/training to new situations	Apply new technology	Develop an action plan	Evaluate results/outcomes	Analyze personal occupational aptitudes/preferences	Investigate employment prospects of a career field/occupation	Investigate training requirements for a career field/occupation	Investigate benefits of a career field/occupation	Compare/evaluate career options	Develop personal career path	Locate appropriate jobs	Analyze duties/requirements/benefits of
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PLOYABILITY SKILLS

SOCIAL STUDIES SKILLS

| Job Acquisition Development | | |

Animal Science

Student Workbook

Part 1

Developed by the
Curriculum and Instructional Materials Center
for the Division of Agricultural Education
Oklahoma Department of Vocational and Technical Education

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OBJECTIVE SHEET

SAFETY

A-1

INTRODUCTION

Look in your daily paper and it's likely that you'll find at least one story about a farmer or rancher who was maimed or killed in a farm accident. Recently, a stockman in Oklahoma was late coming home from baling hay, so his wife went to the field to look for him. She found him, crushed to death under a bale that he had been loading improperly. His death, like most accidents, was caused by **human error**. In this unit you will be introduced to the basic safety procedures for working with animals. Your future well-being will depend upon your training, and how well you implement and follow safety procedures.

PREREQUISITE

None

FOCUS ASSIGNMENTS

Reading Comprehension
- Gain factual information
- Analyze cause and effect
- Draw conclusions

Language
- Use standard grammar, spelling, and capitalization
- State ideas clearly

Composition
- Use complete sentences

FOCUS ASSIGNMENTS	
PREREADING:	Read *The Dark Side of the Sun: Sun Exposure and Agriculture*, by Julie Mitchell, OSU Extension Facts No. 1721.
WRITING:	Look up and write a definition for *melanoma*. Write a short essay (one paragraph to one page) about how to protect yourself from the harmful effects of the sun.

UNIT OBJECTIVE

After completing this unit, you will show the following competencies by mastering the activities on the Assignment Sheets and by scoring at least 85% on the Written Test.

SPECIFIC OBJECTIVES

1. Choose the word or phrase to complete statements about safety in the animal science industry.
2. Choose the word or phrase to complete statements about trends in animal science.
3. Report on current events in animal science. (Assignment Sheet 1)
4. State safety factors to observe in working livestock.
5. Select factors affecting facility safety.
6. State safety precautions for equipment.
7. Observe livestock facilities for potential hazards. (Assignment Sheet 2)
8. Analyze case studies for behavioral factors that affect livestock handling.
9. List common livestock-handling injuries and their causes.
10. Develop a list of safety procedures for handling livestock. (Assignment Sheet 3)
11. Choose the word or phrase to complete statements about hazards of animal diseases.
12. Discuss the impact of hormone use on animal and public safety.

INFORMATION SHEET	SAFETY	A-1

OBJECTIVE 1

Choose the word or phrase to complete statements about safety in the animal science industry.

Optional Activities/ Resources
- Video
- Talk with a medical or paramedical professional to display and describe items found in a comprehensive first-aid kit. Check with your local Red Cross agency for resources.
- Display and demonstrate safety equipment.
- Write the OSHA requesting safety information.

(?) Discuss the following true statement; "Farming is the most dangerous occupation in the U.S."

WORDS YOU SHOULD KNOW	
safety	freedom from danger, risk, or injury

FIGURE 1

Farm accidents kill nearly 2,000 workers every year, and leave another 170,000 disabled. The majority are machinery-related. Injuries that cause disabilities often happen in a matter of seconds; disabilities last a lifetime.

- Statistics show that people older than 65 and younger than 25 have more accidents. Lack of experience and training affects younger workers while older workers succumb to the effects of age.

- Accidents are usually caused by human error. Following proper procedures greatly reduces risk. Most accidents are caused by:
  - being tired
  - not paying attention
  - poor judgement
  - rushing to get a job done
  - stress
  - attempting jobs for which you are not properly trained
- Accidents and injuries can be reduced by
  - following proper procedures

    ☞ **NOTE:** You must be properly trained.
  - wearing proper protective clothing

    ☞ **NOTE:** Proper clothing will depend on the job. If you are uncertain what clothing is appropriate, ask someone who knows.

    - hat with a wide brim
    - safety glasses or goggles
    - leather shoes with steel toes
    - coveralls
    - ear plugs
    - gloves
    - hard hat
    - mask or respirator
    - sunblock with SPF of 15 or greater

      ☞ **NOTE:** Skin cancer is linked to sun exposure.

- observing warning signs and Federal Safety Code Colors
  - red – identifies areas of danger or emergency, such as fire extinguishers
  - orange – indicates warning
  - yellow – indicates caution
  - blue – conveys information regarding the status of equipment: "OUT OF ORDER"
  - green – indicates the presence of safety equipment such an eye-wash station
  - purple – indicates radioactivity
- installing equipment properly
- using tools and equipment skillfully
- storing fuels, tools, chemicals, and supplies properly
- servicing machines according to manufacturers' recommendations
- avoiding exhaustion
- thinking ahead

- Federal law requires that employers provide safe and healthy work places. Employers must tell employees about their rights and responsibilities under OSHA (Occupational Safety and Health Act). OSHA requires employers of eleven or more employees to keep and submit records of work-related injuries.

- First-aid kits and fire extinguishers should be readily available.

OBJECTIVE 2

Optional Activities/ Resources
- Video
- Visit a poultry production facility to observe the level of automation.

Choose the word or phrase to complete statements about trends in animal science.

WORDS YOU SHOULD KNOW	
DNA (deoxyribonucleic acid)	a protein-like genetic material on genes and chromosomes that controls inheritance; a DNA molecule is made up of two strands in the form of a double helix (you can create a double-helix when you twist a rubber band several times)
economies of scale	an economic theory that states: large producers are able to produce products more efficiently than small producers
gene	a complex molecule located on a chromosome which is involved in the transmission of inherited traits; genes are always in pairs
genetic engineering	a technology involving the removal, modification, or addition of genes to a DNA molecule

- Agriculture is a basic industry, employing slightly more than 20% of the total work force
  - Approximately 3.7 million workers are engaged in agricultural production on the farm.
  - Fifteen to sixteen million workers are employed in storing, transporting, processing, and selling farm products.
  - Three million workers supply the seeds, fertilizers, and other supplies needed by farmers.
- **Reasons for advancements in animal science**
  - **animal scientists** – Animal scientists in all fields have made significant contributions. Herd management, breeding pens, and parasite and disease control represent only a few of the many advances made by specialists studying every aspect of animal science.
  - **genetics** – The use of genetics has significantly improved the quality of plants and animals. Genetic engineering is opening new horizons in food quality, food quantity, and food types.

- **veterinary procedures** – Veterinary procedures have improved productivity and reduced losses due to illness and death.

- **machines** – Machines have made animal science more efficient.

- Technological advances are made in animal industries with high profit ratios.

  - **horse racing** – Horse racing is a multi-billion dollar industry. Significant advances have been made in breeding, artificial insemination, training, and veterinary practices.

  - **poultry** – Mass-produced poultry is a relatively young industry. Poultry production became specialized in the late 1800s, and today most poultry is raised in large confinement flocks. Poultry processing is highly automated to meet a growing consumer demand.

  - **cattle** – Studies indicate cattle were originally tamed 18,000 years ago. Selecting and breeding cattle represents one of the first attempts to improve agriculture, and the beginnings of animal science. Significant advances have been made in breeding, artificial insemination, feed conversion, and veterinary practices.

- The increased use of machinery and automation have resulted in economies of scale.

  - There are few small, independent poultry producers today. The majority of producers run large confinement flocks.

  - 1993 reports list 20,000 swine producers; it is estimated that there will be only 5,000 by the year 2000.

OBJECTIVE 3

Complete Assignment Sheet 1.

OBJECTIVE 4

Optional Activities/ Resources
- Video
- Share personal experiences involving safety and accidents when working with livestock.
- Visit a livestock facility and discuss safe operating procedures.

State safety factors to observe in working livestock.

WORDS YOU SHOULD KNOW	
catwalk	a narrow platform
flight-zone	the area around animals that, if invaded, will cause animals to flee
tranquilizer	drug used to calm an animal

When handling livestock, watch for these potential hazards:

- Wear protective clothing: steel-toed shoes, gloves, coveralls.

  ☞ **NOTE:** Do not wear gloves around machinery with moving or rotating parts. The glove can get caught and you can lose a hand.

- Use man-gates in pens to allow quick and easy exits for workers.
- Avoid handling animals in small, confined areas.
- Avoid slippery floors.
- Use catwalks along chutes.
- Maintain adequate lighting.
- Remove horns from dangerous animals.
- Restrain animals properly for foot trimming, surgery, or other operations.
  - **mechanical restraint** – holding animals with machinery
  - **physical restraint** – holding animals with bodily force
  - **chemical restraint** – controlling animals with tranquilizers
- Stay in the animal's line of sight; approach animals from the front.
- Avoid entering the "flight zone."
- Avoid making sudden, loud noises.

- Allow cattle to follow herd leaders.
- Do not trust males, regardless of how docile they seem.
- Respect maternal instincts.

  ☞ **NOTE:** Never work with piglets in the same pen with the sow.

- Use proper disinfectant procedures when entering or opening body cavity.

OBJECTIVE 5

Select factors affecting facility safety.

Optional Activities/ Resources
-- Visit a livestock facility to review safety procedures.

- **Livestock facilities**
  - Keep all facilities clean and orderly.
  - Modify slippery steps and floors.
  - Use solid pens, curved chutes, gates, and ramps.
  - Use strong latches to prevent premature opening.
  - Inspect electric, water, feed, ventilation, and fire safety systems regularly.
  - Keep doors and gates closed.
  - Keep children and visitors out of animal quarters.
  - Use proper ventilation, especially before entering silos or manure pits.
  - Install appropriate alarm and back-up systems.
  - Maintain a comprehensive first-aid kit.
  - Train everyone who works in livestock facilities.
- **Grain and silo storage**
  - Maintain proper ventilation equipment.
  - Never enter a silo alone.
  - Close doors to keep children out of storage facilities.

- Use respirator when handling grain.
- Use silo and storage equipment properly (see Objective 6).
- Beware of fire hazards.
- Train everyone who works in grain and silo storage facilities.

OBJECTIVE 6

State safety precautions for equipment.

Optional Activities/ Resources
– Video
– Talk with an electrician about electrical safety.

- **Maintenance and safety**
  - Operate only after receiving proper training.
  - Wear proper protective clothing.
  - Use the appropriate equipment for the job.
  - Operate and maintain equipment according to instruction manual.
  - Use shields and guards.
  - Inspect your equipment regularly.
  - Replace defective and worn parts.
  - Shut off the power before adjusting.
  - Keep children and other non-operators away from equipment.
  - Equip tractors with roll-over protection equipment.
  - Remove keys from motorized equipment.
  - Use sturdy hitches.
  - Open doors and windows of the storage area before starting equipment.
  - Place appropriate warning signs on equipment.
- **Storage**
  - Use adequate space.
  - Keep storage area clean.

- Store equipment and supplies neatly.
- Maintain a complete first-aid kit.
- Have appropriate fire safety equipment available.
- Place appropriate signs in the storage area.

OBJECTIVE 7

Complete Assignment Sheet 2.

OBJECTIVE 8

Analyze case studies for behavioral factors that affect livestock handling.

Optional Activities/ Resources
- Video
- Visit a livestock auction facility to see how they move livestock from trucks to the auction block.
- Talk with stock managers who control cattle, sheep, and sows about the similarities and differences in behavior.

WORDS YOU SHOULD KNOW	
ethology	the study of animal behavior in the animal's natural habitat

Animal behavior not only affects how you handle animals, but also their productivity. Ethology has provided information on how to handle confined animals effectively. Proper handling ensures safety for both yourself and the animal. Abnormal behavior can be an indication of illness, stress, inadequate nutrition, or other problems.

Factors that affect animal behavior:

- **stress** – Stress is the fundamental concern when handling animals. Animals under stress can cause injury to themselves as well as to the handlers. Stress can result from
  - fatigue
  - transportation
  - dehorning
  - overcrowding
  - abusive handling

- environment
  - extreme heat
  - extreme cold and wind
  - excess moisture
- nutritional deficiencies
- weaning

- **isolation** – Most animals do not like to be isolated. Cattle and sheep will attempt to jump or go through fences if they are isolated and sense other animals nearby.

- **followers** – Livestock have a strong desire to follow. They will actively maintain visual contact with each other. Livestock will also have a tendency to do the same activity at the same time. For example, animals will tend to water at the same time.

- **disposition** – Animal disposition will vary. Disposition is mainly a factor of inherited characteristics. Animals with a wild disposition can be dangerous.

- **maternal instincts** – Mothers, especially cows and sows, may attack if they perceive a threat to their offspring.

- **flight-zone** – The flight-zone represents the "space" that, if violated by you or some other animal, will cause the animal to flee.

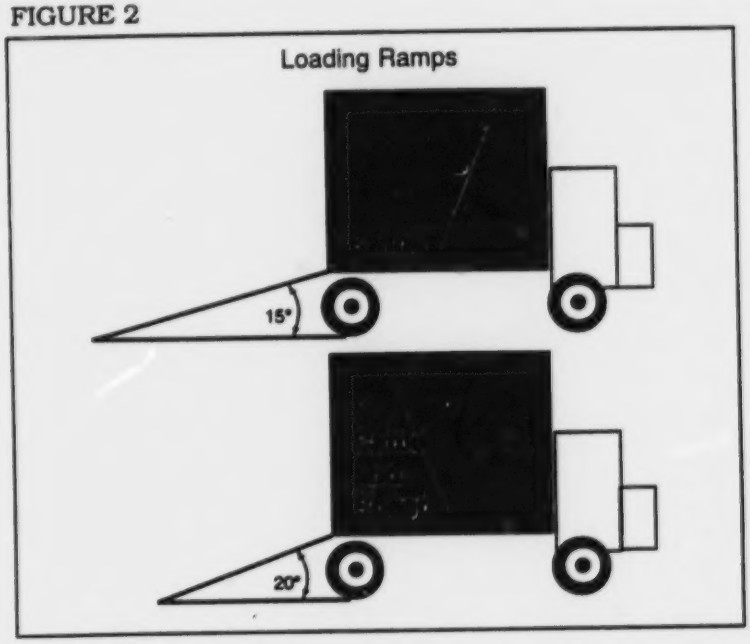
- **movement** – Animals are highly sensitive to quick movements within their range of vision and may run if startled.
  - cattle and swine have a 300-degree range of vision
  - sheep have a 270-degree range of vision

- **noises** – Animals are sensitive to sudden loud noises and may run if startled.

- **"dead end"** – Animals become excited if they sense an area from which they can't escape. Avoid right angle corners and blind alleys. Use diagonal sorting pens, curved sorting chutes, and round pens to reduce the risk.

- **loading ramps** – A loading ramp that is too steep will excite animals.
  - cattle – The loading ramp should be no more than 20 degrees. (Figure 2)
  - swine – The loading ramp should be no more than 15 degrees. (Figure 2)
  - sheep – The loading ramp may be slightly steeper than 20 degrees.

FIGURE 2



- **memory** – Animals will remember how they were treated. For example, if an animal is mistreated during loading, it will react accordingly during future loading attempts.

OBJECTIVE 9

List common livestock-handling injuries and their causes.

Optional Activities/ Resources
– Talk with a doctor about injuries and injury prevention.

Common injuries in handling livestock include:

- **mashed and broken fingers** – caused by gates and unexpected animal movement
- **bruises and lacerations** – caused by kicks and being stepped on

- **rope burns** – caused by sudden rope movement through an unprotected hand
- **eye injuries** – caused by dirt and dust
- **puncture wounds** – caused by splinters, horns, or tools and equipment
- **broken arms and legs** – caused by falls and unexpected animal movement
- **crushed internal organs** – caused by shifting animals forcing the human body against an immobile surface or structure

OBJECTIVE 10

Complete Assignment Sheet 3.

OBJECTIVE 11

Choose the word or phrase to complete statements about hazards of animal diseases.

Optional Activities/ Resources
– Talk with a doctor, veterinarian, or other medical professional about zoonoses and prevention.

WORDS YOU SHOULD KNOW	
disease	condition apart from normal that prevents normal activity or performance of vital functions
zoonosis (zōh-AN-uh-sis)	any disease that can be transmitted from animals to man under natural circumstances; *zoonotic* (zoh-uh-NOT-ic)

- **Common zoonoses**
  - **rabies** – an acute, infectious, often fatal viral disease that attacks the nervous system; transmitted through saliva

    ☞ **NOTE:** If you are bitten by an animal that you suspect has rabies, capture it; or kill it without injuring the head. Take the live animal or the carcass or head for analysis to a veterinarian. See a doctor.
  - **brucellosis** – a bacterial infection that causes recurrent fever in humans; transmitted by contact with tissues, blood, urine, and vaginal discharge
  - **spotted fever and Lyme's disease** – infectious diseases transmitted by ticks and mites

- **leptospirosis** – a bacterial infection that causes an influenza-like illness and possibly death; transmitted through urine from an infected cow; bacteria enters the human body through cuts in the skin or contact with membranes; workers in milking pens are particularly at risk due to frequent contact with urine

- **salmonellosis** – any of a number of bacteria causing a wide range of symptoms, including death; transmitted through contact with body fluids and feces

  ☞ **NOTE:** Salmonellosis is also transmitted to humans through eating contaminated dairy products or eggs.

- **ringworm** – a fungal disease caused by a few closely related fungi that results in an itchy, ring-shaped patch on skin; readily transmitted by touching an infected animal

- **tuberculosis** – a disease characterized by the formation of tubercles (small nodules containing pus or dry yellowish cheesy material) in any or all organs; transmitted generally by the respiratory system and, in some cases, by contact with infected tissues or fecal material

• **Techniques to prevent zoonoses**

  - Wear rubber gloves when attending to sick animals.
  - Wear protective clothing.
  - Maintain a preventative vaccination program.
  - Maintain a clean and healthy environment by using
    - proper housing and ventilation
    - proper pasture rotation
    - proper manure disposal
    - proper carcass disposal
  - Quarantine sick animals.
  - Avoid contact with wild animals.
  - Wash your hands thoroughly in warm water after handling animals and always before eating.

OBJECTIVE 12

Optional Activities/ Resources
– Identify current issues regarding hormone use.

Discuss the impact of hormone use on animal and public safety.

WORDS YOU SHOULD KNOW	
hormone	an organic material secreted by a body gland which helps regulate body functions
synthetic hormone	a hormone made by an industrial process

Scientists have identified many hormones and have been successful in synthesizing them. The first synthetic hormone (diethylstilbestrol - DES) was produced in 1954.

- DES, a synthetic estrogen, was used as a feed additive to improve feed efficiency and increase the rate of growth. During the 1960s, DES was given to pregnant women to prevent miscarriages. DES was found to cause a rare form of cancer in some of the daughters of the treated women. Further lab studies suggest that massive amounts of DES cause cancer in mice. The FDA (United States Food and Drug Administration) banned its use as a feed additive in 1979.

- Hormones added to feed have increased meat production. If hormone feed additives were eliminated, beef production would decrease by 13%. There is public concern regarding synthetic hormones.

- Research by the FDA has shown no adverse affects when hormones are used properly. The WHO (World Health Organization) has reached the same conclusion.

    - Individuals who administer hormones should be trained to insure proper use.

- The EEC (European Economic Community) bans all meat produced with the use of hormones or hormone-like compounds.

- Hormones presently being used and tested include somatotropins and melengestrol acetate:

☞ **NOTE:** See Unit C-4, "Vaccinations and Drugs" for more information and a more complete listing of hormones.

- Somatotropin (growth hormone)
  - Bovine somatotropin (BST) is a growth hormone that increases milk production in dairy cows. The FDA approved the use of BST for commercial use in 1994.
  - Porcine somatotropin (PST) is a growth hormone that increases milk production in sows. Commercially applicable PST is still in the development phase; FDA approval must still be secured.

    ☑ **NOTE:** The commercial use BST and PST will have a dramatic affect on dairy production and hog production.

- Melengestrol acetate (MGA) improves the daily rate of gain for feedlot heifers by 10% and feed efficiency by 6%. MGA is approved by the FDA and is being used commercially.

ASSIGNMENT SHEET 1	SAFETY	A-1

Name _____ Score _____

OBJECTIVE 3

Report on current events in animal science.

EQUIPMENT AND SUPPLIES

- Three current articles

INSTRUCTIONS

Reading Comprehension
- Gain factual information
- Analyze cause and effect
- Draw conclusions

Research and Reference
- Use magazines and newspapers

Language
- Use standard grammar, spelling, and capitalization
- State ideas clearly

Composition
- Use complete sentences

Oral Presentation
- Make informative presentations
- Use good speaking techniques
- Integrate visual materials into oral presentations

Part 1:

Locate three articles on current events in animal science. Have your instructor check the articles to determine whether or not they are appropriate. Finally, write a clear, concise summary of each article. Use proper spelling, grammar, and punctuation.

Your instructor will add to the following list of suggested topics.

Suggested topics:

employment opportunities
conservation
genetic engineering
agriculture-related health issues
advances in breeding
international trade issues
newly introduced equipment
feed additives
vaccinations
current legislation
animal welfare
artificial insemination
hormone use
computer use in animal science
veterinary advances
disease prevention
animal health products
marketing issues

Part 2:

Prepare and present an oral presentation on one of the articles that you summarized in Part 1. Your instructor will determine the length of the presentation. Use visual aids, such as charts or posters to make the presentation interesting and clear.

☛ **NOTE:** Practice your presentation before giving it to the class.

ASSIGNMENT SHEET 2	SAFETY	A-1

Name _____ Score _____

OBJECTIVE 7

Observe livestock facilities for potential hazards.

Required Activities/Resources
- Field trip to an animal production operation.

EQUIPMENT AND SUPPLIES

- Notebook and pen
- Livestock facility to investigate

INSTRUCTIONS

Language
- Use standard grammar, spelling, and capitalization
- State ideas clearly

Composition
- Construct graphics and symbols

Cognitive Activities
- Collect/record information
- Identify/develop alternatives
- Create a finished product

Part 1:

Your teacher will arrange a visit to a livestock facility. Prepare a list of potential hazards. You should be able to find at least twenty potential hazards.

Part 2:

Using the list from Part 1, create a **two column table** that shows the potential hazards and suggestions to rectify the potential hazards.

EXAMPLE: Slippery stairs could be corrected by applying adhesive strips to the steps.

ASSIGNMENT SHEET 3	*SAFETY*	**A-1**

Name _____ Score _____

OBJECTIVE 10

Develop a list of safety procedures for handling livestock.

INSTRUCTIONS

Cognitive Activities
- Identify critical elements/issues

Imagine the following two scenarios and develop a list of safety procedures for each. Each list should include at least seven safety concerns.

1. Moving a herd of twenty cows from one pasture to another pasture that is ten miles away. You use two trucks with trailers and have a helper.

2. Castrating a 500 lb bull calf.

OBJECTIVE SHEET

CAREERS

A-2

INTRODUCTION

Two girls are sitting at a table in a cafe. The first tells the second about a college program that she has enrolled in. "Before long," she says, "I'll be a veterinarian." The second girl shrugs her shoulders and says, "I don't have any idea what I'm going to do." Planning ahead for your career gives you a sense of direction and control in your life. This unit will introduce you to careers in animal science. Finding a career that you enjoy will take effort. The earlier you start, the better.

PREREQUISITE

None

FOCUS ASSIGNMENTS

Reading Comprehension
- Gain factual information
- Analyze cause and effect
- Draw conclusions

Language
- Use standard grammar, spelling, and capitalization
- State ideas clearly

Composition
- Use complete sentences

FOCUS ASSIGNMENTS	
PREREADING:	Read *Skills For Employment: Assessing Job Skills* by Sarah E. Drummond, OSU Extension Technical Bulletin No. T-6102.
WRITING:	Write a short essay (one paragraph to one page) on "Why it is important to find a job that is right for you."

UNIT OBJECTIVE

After completing this unit, you will show the following competencies by mastering the activities on the Assignment Sheets and by scoring at least 85% on the Written Test.

SPECIFIC OBJECTIVES

1. Discuss employment opportunities at various education levels.

2. Compare degree requirements in animal science from two colleges or universities. (Assignment Sheet 1)

3. Compare salaries and benefits in various careers. (Assignment Sheet 2)

4. Match areas of study/specialization in animal science required for a specific project to their descriptions.

5. State requirements for a career in animal science.

6. Interview someone in the animal science industry. (Assignment Sheet 3)

7. Select true statements about organizations that employ people trained in animal science.

8. Identify the occupations that are necessary to support animal agriculture in your community. (Assignment Sheet 4)

9. Outline a presentation on animal science careers. (Assignment Sheet 5)

10. Give a presentation on a career in animal science. (Assignment Sheet 6)

INFORMATION SHEET

CAREERS

A-2

OBJECTIVE 1

Optional Activities/Resources
- Talk with a career counselor about career selection.
- Complete an interest inventory.
- Video

Discuss employment opportunities at various education levels.

WORDS YOU SHOULD KNOW	
career	a chosen pursuit; a field of interest
job	a position in which one is employed
profession	a particular occupation, especially one that requires specialized education

Almost all jobs in the wide range of employment opportunities in animal science are related to educational level and job experience. It is never too early to start considering career choices. You will know what jobs to pursue if you have made a career choice. A 1990 study by the United States Department of Agriculture (USDA) shows that there are more agriculture jobs available for college graduates than graduates to fill them.

- **Benefits of a career in animal science**
  - allows you to be part of a dynamic, interesting, and challenging industry
  - allows you to be in an industry in which you can use a balance of mental and physical skills
  - allows you to have an occupation associated with the production of tangible and useful products that are essential to all humans
  - allows you a good chance of job security
- **high school education** – A high school education enables you to learn basic skills on the job in an entry level position.

  EXAMPLES: Herdsman, feed mill worker, milking machine operator, sheet shearer, groomer, chick grader, egg candler, small animal producer, slaughterhouse worker, milk hauler, poultry processing plant worker

- **two-year associate degree** – A two-year associate degree enables you to enter a profession at a level higher than with a high school education. There is greater possibility for advancement.

  ☞ **NOTE:** Computers are becoming common in most businesses. Computer competency is becoming a necessity; computer education will enhance your ability to get desirable positions.

  EXAMPLES: Veterinarian assistant, computer operator, farrier, poultry vaccinator, producer, artificial insemination technician, meat cutter, embryo implant technician, wool grader, animal buyer

- **four-year college degree** – A four-year college degree enables you to enter the work force at a professional level with a high degree of career advancement possibility. The average annual starting salary for an entry level position with a Bachelor of Science was $20,000 in 1990. The following table shows the post-graduation activities of Bachelor Degree recipients in agriculture. (Table 1)

  ☞ **NOTE:** Before you accept a certain salary, you should research the salary level given for that position. Salary levels depend on the qualifications required and the supply/demand for the position.

  Table 1

Post-graduation Activity	Percent of Graduates
Agribusiness (industry)	40%
Graduate and professional study	20%
Farming and ranching	15%
Education, including extension	5%
Government (national, state, and local)	10%
Miscellaneous	10%

  EXAMPLES: Farm or ranch manager, producer, high school agriculture teacher, extension agent, agricultural journalist, meat grader, company representatives for animal feed and health products, field service technician, hatchery manager, dairy inspector, veterinary or research technician

- **advanced college degree** – An advanced college degree enables you to become a professor, a researcher, or other specialist. The average annual starting salary for a Master of Science was $25,000 in 1990. The average annual starting salary for a Doctor Of Philosophy was $35,000 in 1990.

  EXAMPLES: Veterinarian, meat inspector, animal geneticist, animal nutritionist, reproductive physiologist, microbiologist, research scientist, college professor

- **Related experience**

  ☛ **NOTE:** Related experience provides an opportunity to gain on-the-job skills and training. The level of your related experience will increase as you become more educated and skilled.

  - clubs and organizations
    - FFA
    - 4-H
    - Farm Bureau
    - Farmers Union
    - breed associations
  - work experience
    - summer jobs
    - part-time jobs
    - internships during junior or senior years in college

- **Choosing the proper career**

  - Complete an interest inventory.

    ☛ **NOTE:** An interest inventory is a self-test that explores personality and job interests. You can ask your guidance counselor for more information about taking an interest inventory.

- ☐ Understand your skills and interests – look to your own preferences and talents.

  ☞ **NOTE:** People who enjoy working with their hands will be looking at different careers than someone who thrives on working with computers. What are your interests?

- ☐ Understand your limitations.

  ☞ **NOTE:** You must realize your limitations when choosing a career. For instance, it takes physical strength to pull a calf during the birthing process. If you do not have the appropriate level of strength, working with cattle might not be the best choice for you.

- ☐ Consider opportunities for advancement.

  ☞ **NOTE:** Keep your future in mind. Ask yourself if the career will satisfy your individual needs for new opportunities, challenge, and professional and financial advancement.

- ☐ Consider health hazards.

  ☞ **NOTE:** Always consider the affect that a job has on your immediate and long term health.

OBJECTIVE 2

Complete Assignment Sheet 1.

OBJECTIVE 3

Complete Assignment Sheet 2.

OBJECTIVE 4

Match areas of study/specialization in animal science required for a specific project to their descriptions.

Required Activities/Resources
- Handout 1

Optional Activities/Resources
- Talk with individuals about their animal science careers.

Focusing on a degree program will enable you to investigate career opportunities. Categories of animal science careers include:

- **production** – Careers in production require solid knowledge of livestock, health and nutrition, behavior, development, and business studies (such as economics, cash flow, costing, and pricing). The production industry is the foundation of the animal science industry.

- **science** – Careers in science require a strong education in the scientific method, chemistry, nutrition, physiology,

biology, and communication. Scientific research has increased profits and efficiency and improved animal health, reproduction, and nutrition.

- **agribusiness** – Careers in agribusiness require a basic knowledge of livestock along with comprehension and skills in business, advertising, economics, computer science, and effective communications.

- **agricultural sales** – Careers in agricultural sales require a basic knowledge of agriculture and a desire to be of service, along with skills in sales, business, marketing, advertising, computer use, and effective communication.

- **food industry** – The food industry offers many opportunities in processing, packaging, and distributing food that is nutritious, safe, convenient, attractive, and economical. Careers require a basic knowledge of livestock along with comprehension of marketing, advertising, sales, processing, economics, and computer science.

- **education** – Opportunities in education are available at all levels. Public education requires certification, while private schools are able to hire non-certified teachers. Careers require a broad knowledge of agriculture, teaching skills, and a commitment to helping young people learn and develop.

- **public sector** – The federal government, the state government, and local counties hire employees with degrees in animal science for extension services, inspection services, research, conservation, and many more.

  ☞ **NOTE:** Handout 1 describes the position of U.S. Food Inspector and the qualification requirements.

- **international** – International opportunities are also plentiful. The global agricultural community will have to address the nutritional needs of the growing global community. Careers require a foundation knowledge of agriculture in addition to economics, business, banking, trade, and language.

OBJECTIVE 5

State requirements for a career in animal science.

Optional Activities/Resources
- Talk with industry and government recruiters about requirements for various careers in animal science.

The most satisfying career involves matching your skills and desires with career opportunities. Careers require planning and work. You will not be hired for a position that you desire unless you are qualified. Requirements and skills for a career in animal science vary, depending on career choice, but most include:

- **scientific background** – Science provides the foundation for understanding agriculture.

  ☞ **NOTE:** You must have the proper technical training for the position that you desire.

- **practical skills** – Practical skills exhibit how well you apply your knowledge to action.

  ☞ **NOTE:** Internships and summer jobs enable you to enhance your practical skills, learn to work with others, and meet people who can help you in your future.

- **communication** – Speech and written communication are important in all career areas.

  ☞ **NOTE:** Personal communication, which is also important, includes appearance, confidence, and composure.

- **dedication** – Dedication enables you to demonstrate your desire to work in the career.

  ☞ **NOTE:** If an employer had to decide between two equally qualified candidates, the employer will choose the one who shows the greater dedication.

- **dependability**

  - ☐ being on the job (or in class) every day
  - ☐ starting work on time
  - ☐ being prepared
  - ☐ giving a full day's work for a full day's pay
  - ☐ observing safety practices

- **professionalism**

  ☞ **NOTE:** You must act professionally in order to win the respect of your supervisors. Strong personal references will provide you with support to gain promotions within a company or to seek employment in other companies.

  - ☐ acting in a business-like manner appropriate to the position

- dressing appropriately, always looking clean and neat
- using appropriate language
- developing a reputation for integrity

- **Skills necessary for gaining employment**

☛ **NOTE:** There are many publications that you can use to develop skills for gaining employment. Ask your career counselor for resources and check your public library. The following resources are available from the OSU Cooperative Extension Service:

Skills for Employment: Assessing Job Skills (T-6012)
Skills for Employment: Writing a Resume (T-6103)
Skills for Employment: The Job Search (T-6104)
Skills for Employment: The Job Application (T-6105)
Skills for Employment: The Job Interview (T-6106)

- assessing your job skills
- writing a resume
- searching for a position
  - informational interviews with people who work in fields that interest you
  - corresponding with public and private organizations to determine job availability
- applying for a position
- interviewing
- following up with correspondence
- accepting and starting the job

OBJECTIVE 6

Complete Assignment Sheet 3.

OBJECTIVE 7

Required Activities/Resources
- Handout 3

Optional Activities/Resources
- Write a letter to a public or private organization requesting information about job opportunities.

Select true statements about organizations that employ people trained in animal science.

WORDS YOU SHOULD KNOW	
lobbyist	a person employed to influence legislators to introduce or to vote for measures favorable to the interest he or she represents

Both public and private organizations employ people trained in animal science. You will have to do some research to find a position that is available and fits your interests, career goals, and skills.

- **federal agencies** – Federal policies and laws govern many of the steps from production to consumption. Federal agencies employ thousands of professionals with animal science training. Salary is based on the U.S. Civil Service Commission ratings.

  ☞ **NOTE:** Most positions in federal agencies are under the U.S. Civil Service Commission and salaries are determined by GS (Government Service) ratings of 1-15. More information on the federal government and its departments, including addresses, can be found in *The United States Government Manual*, located in the reference section of your local library; or may be obtained by writing:

  Office of the Federal Register
  National Archives and Records Administration
  Washington, DC 20408

  EXAMPLES: U.S. Department of Agriculture (see Handout 3)
  Peace Corps
  Bureau of Land Management
  Bureau of Outdoor Recreation
  Department of the Interior
  Environmental Protection Agency
  Department of Commerce
  Department of Defense

- **state agencies** – State agencies offer technical assistance and are involved in inspection, research, education, and enforcement of state laws related to agriculture. Salary is based on state civil service ratings.

  EXAMPLES: State Department of Agriculture
  Extension Services
  Department of Vocational-Technical Education
  Department of Public Safety

- **public and private institutions** – Public and private institutions hire individuals with animal science training for activities including disease prevention, teaching, research, administration, design and analysis, public relations, marketing, and consulting. Salary will depend on education and experience level.

  EXAMPLES: (Most of the organizations listed below are state and national FFA sponsors for animal science events. This list is intended to indicate the range of employment opportunities, not to be inclusive of all FFA sponsors.)

  - **veterinary medicine and pharmaceutical companies** such as C. E. Swaim Serum Company, Pitman-Moore, Inc., Merck AGVET Division, Schering-Plough Animal Health, American Cyanimic Co./Ag. Division, DEKALAB Genetics Corporation, Pfizer Animal Health
  - **producers**
  - **commercial marketers and marketing associations** such as OKC West Livestock Market, Inc., Livestock Marketing Association
  - **veterinarians**
  - **food processing companies** such as Tyson Foods, Blue & Gold Sausage Company, ConAgra, Sara Lee Corp., Hudson Foods, Inc., Archer Daniels Midland Co., Circle of Gold Ground Beef and Chicken, Ag Processing Inc.
  - **breed associations** such as American Sheep Industry Association, Oklahoma Sheep & Wool Producers, Inc., Associated Milk Producers, Inc., (see Unit A-3)
  - **lobbyists and promotional organizations** at the state and federal level such as the National Livestock Commission, Oklahoma Cattleman's Association, Oklahoma Pork Council, National Food and Energy Council, Enid Board of Trade, Oklahoma Beef Industry Council

- **publishers and distributors of agriculture textbooks and teaching materials** such as Nasco International, CIMC
- **feed and equipment suppliers** such as Purina Mills, Inc., Evergreen Mills, Kent Feeds, Inc., Green County Animal Clipper Sales and Service, Showstring Embroidery & Monogram, Supersweet Feed, Case International Harvester, Vigortone Ag Products, ZENECA Ag Products Group, Chevy Trucks, Northrup King Co.
- **chemical companies** such as Cargill, Monsanto Agricultural Company
- **agricultural insurance and finance companies and associations** such as Oklahoma Farm Bureau, Farm Credit Services, Production Credit Associations, Federal Land Bank Associations of Oklahoma

OBJECTIVE 8 **Complete Assignment Sheet 4.**

OBJECTIVE 9 **Complete Assignment Sheet 5.**

OBJECTIVE 10 **Complete Assignment Sheet 6.**

ASSIGNMENT SHEET 1

CAREERS

A-2

Name _____ Score _____

OBJECTIVE 2

Compare degree requirements in animal science from two colleges or universities.

EQUIPMENT AND SUPPLIES

- Two college catalogs

INSTRUCTIONS

Reading Comprehension
- Gain factual information

Research and Reference
- Use in-book reference tools

Language
- Use standard grammar, spelling, and capitalization
- State ideas clearly

Composition
- Use complete sentences

Your instructor will provide you with catalogs from two colleges or universities that offer degrees in animal science. In Part 1, you will list the requirements for a specific animal science degree. In Part 2, you will write a short essay (one paragraph to one page) comparing the requirements.

☞ **NOTE:** You may wish to investigate the cost of the degree, if the information is provided in the catalogs. Colleges and universities generally charge a fixed rate per tuition hour. Keep in mind that you will also have living expenses while attending school.

Part 1: List the degree requirements

In the space below, list the degree requirements for the two schools.

Degree _____

School No. 1 _____	**School No. 2** _____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

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Degree requirements (continued)

School No. 1 _____ **School No. 2** _____

Part 2: Essay

Write a short essay (one paragraph to one page) in the space provided below comparing the two degree requirements. Use correct grammar, spelling, and punctuation.

ASSIGNMENT SHEET 2	*CAREERS*	**A-2**

Name _____ Score _____

OBJECTIVE 3

Compare salaries and benefits in various careers.

INSTRUCTIONS

Reading Comprehension
- Gain factual information

Research and Reference
- Select useful resources
- Locate resources
- Use computer data base

Listening
- Apply active listening skills

Interactive Communications
- Conduct/receive interviews

Different animal science careers have different salaries and benefits. For example, a rancher's salary and benefits will be different from a USDA poultry inspector's salary and benefits. Part of your career choice decision will be based on compensation (salary and benefits).

You must research salaries and benefits to be able to make an educated decision. In Part 1, you will research and compare different salaries for careers in the animal science industry. In Part 2, you will research and compare salaries for careers in other fields.

Sources of information include:

- interviews with friends and family
- USDA publications
- career literature and computer programs at your local library, school career counseling office, or vo-tech school
- interviews with people in your community
- career counselors at your school

Part 1

Research and compare salaries in the animal science industry. Choose positions that are appropriate for each education level.

High School Degree

Position #1: _____

entry-level salary	$
salary after 5 years	$
salary after 10 years	$
salary after 15 years	$

Position #2: _____

entry-level salary	$
salary after 5 years	$
salary after 10 years	$
salary after 15 years	$

2-Year Associate Degree

Position #1: _____

entry-level salary	$
salary after 5 years	$
salary after 10 years	$
salary after 15 years	$

Position #2: _____

entry-level salary	$
salary after 5 years	$
salary after 10 years	$
salary after 15 years	$

4-Year College Degree

Position #1: _____

entry-level salary	$
salary after 5 years	$
salary after 10 years	$
salary after 15 years	$

Position #2: _____

entry-level salary	$
salary after 5 years	$
salary after 10 years	$
salary after 15 years	$

Advanced College Degree

Position #1: _____

entry-level salary	$
salary after 5 years	$
salary after 10 years	$
salary after 15 years	$

Position #2: _____

entry-level salary	$
salary after 5 years	$
salary after 10 years	$
salary after 15 years	$

Part 2

Research and compare salaries in other industries. Choose positions that are appropriate for each education level.

High School Degree

Position #1: _____

entry-level salary	$
salary after 5 years	$
salary after 10 years	$
salary after 15 years	$

Position #2: _____

entry-level salary	$
salary after 5 years	$
salary after 10 years	$
salary after 15 years	$

2-Year Associate Degree

Position #1: _____

entry-level salary	$
salary after 5 years	$
salary after 10 years	$
salary after 15 years	$

Position #2: _____

entry-level salary	$
salary after 5 years	$
salary after 10 years	$
salary after 15 years	$

4-Year College Degree

Position #1: _____

entry-level salary	$
salary after 5 years	$
salary after 10 years	$
salary after 15 years	$

Position #2: _____

entry-level salary	$
salary after 5 years	$
salary after 10 years	$
salary after 15 years	$

Advanced College Degree

Position #1: _____

entry-level salary	$
salary after 5 years	$
salary after 10 years	$
salary after 15 years	$

Position #2: _____

entry-level salary	$
salary after 5 years	$
salary after 10 years	$
salary after 15 years	$

ASSIGNMENT SHEET 3	*CAREERS*	**A-2**

Name _____ Score _____

OBJECTIVE 6

Interview someone in the animal science industry.

EQUIPMENT AND SUPPLIES

- Handout 2
- List of questions to ask
- Pad for taking notes

INSTRUCTIONS

Reading Comprehension
- Gain factual information

Research and Reference
- Select useful resources
- Locate resources

Language
- Use standard grammar, spelling, and capitalization
- State ideas clearly

Composition
- Use complete sentences

Research
- Take notes

Functional Writing
- Write letters

Listening
- Apply active listening skills

Interactive Communications
- Conduct/receive interviews

You have to have an understanding of a position in order to consider it. Informational interviews provide you with significant information about job possibilities, requirements, advantages, disadvantages, compensation, fringe benefits, and clues about whether a job might be right for you.

This Assignment Sheet provides you with an opportunity to interview someone in the animal science industry. The purpose of the interview is to get as much information as possible. In order to do that, you must prepare questions before the interview.

In Part 1, you will provide your instructor with the name and company (or agency) of the person you wish to interview and the individual's position in the company (or agency). Once your instructor has approved your choice, move on to Part 2. If you have difficulty finding someone to interview, ask your instructor for assistance.

In Part 2, you will do some preliminary research on the company. For instance, if your interviewee works in an artificial insemination facility you should read an article or two about artificial insemination. You will also prepare a list of at least ten questions that you will ask the interviewee. Have your instructor approve your questions prior to completing Part 3, the interview.

In Part 3, you will complete the interview then write and send a follow-up thank-you letter. Dress appropriately for the interview, look clean and neat. Ask your questions, listen, and take notes. After the interview, write the interviewee a short letter thanking him or her for taking the time to visit with you. Have your instructor check the letter. Write or type it neatly, then send it.

In Part 4, you will write a short essay describing your findings.

Part 1: Name and company of interviewee

Name of individual: _____

Position: _____

Company: _____

Part 2: Preliminary research and questions

Write a minimum of ten questions in the space provided below.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Part 3: Completing the interview and sending a thank-you letter

Show your appreciation and keep the thank-you letter brief. Before sending the letter, your instructor should review it to make sure it's satisfactory.

Part 4: Essay

Write a short essay summarizing the information that you learned during your interview.

ASSIGNMENT SHEET 4	*CAREERS*	**A-2**

Name _____ Score _____

OBJECTIVE 8

Identify the occupations that are necessary to support animal agriculture in your community.

EQUIPMENT AND SUPPLIES

- Local yellow pages

INSTRUCTIONS

Reading Comprehension
- Gain factual information

Research and Reference
- Use standard references

In this Assignment Sheet, you will identify some occupations that are necessary to support animal agriculture in your community. You will be responsible for identifying three occupations within the following career categories: retail, wholesale, production, inspection, education, transportation, and service. Use your local yellow pages to identify businesses in your area and call to inquire about animal science occupations.

EXAMPLE: If you call a commercial bank you will learn that loan officers make loans to ranchers and farmers. The loans are necessary for ranchers and farmers to stay in business. Therefore, a loan officer specializing in agriculture loans is required to support animal agriculture in your community.

Under each heading, write three occupations that are necessary to support animal agriculture in your community. If you are having trouble identifying companies that fall into the categories, ask your instructor for assistance.

Retail

_____

_____

_____

Wholesale

_____

_____

_____

Production

_____

_____

_____

Inspection

_____

_____

_____

Education

_____

_____

_____

Transportation

_____

_____

_____

Service

ASSIGNMENT SHEET 5	*CAREERS*	**A-2**

Name _____ Score _____

OBJECTIVE 9

Outline a presentation on animal science careers.

EQUIPMENT AND SUPPLIES

- Handouts 4 and 5

INSTRUCTIONS

Language
- Use standard grammar, spelling, and capitalization
- State ideas clearly

Composition
- Develop preliminary outline

Research
- Take notes

The ability to research information and put ideas together is important in animal science. People who work in the animal science industry often have to present reports on different aspects of their field.

In this Assignment Sheet, you will be outlining a presentation on animal science careers. In Assignment Sheet 6, you will give the presentation to the class.

You will have three weeks to select a topic, gather information, and prepare your presentation. Use your time wisely.

Part 1: Topic Selection

Decide on a topic and clear it with your instructor before you begin putting your speech together.

Topic _____

Why is the topic interesting to you? _____

_____

_____

Why would it be interesting to your audience? _____

_____

_____

What resources will you use to get information? (who will you talk to, what will you read?)

_____

_____

_____

Part 2: Speech Outline

See the General Speech Outline in Handout 4.

NAME _____

Speech Title (try for a catchy title) _____

Introduction

Attention getter (short story, joke, startling or interesting fact):

_____

_____

_____

How I will relate my topic to my audience: _____

_____

_____

_____

Statement of the topic: _____

_____

_____

_____

Body

See the Sample Speech Outline in Handout 5.

The main points are Roman numerals I, II, III. The subpoints are letters A, B, C and examples and explanations are Arabic numerals 1, 2, 3. You should have **no more than** one major point in a 2-minute speech; two major points in a 3-minute speech, three major points in a 4-minute speech, etc.

Include your examples and explanations. Write transitions in the margins between Roman numerals.

Summary

List major points _____

_____

_____

_____

_____

Conclusion

How will you conclude the speech (1) with a strong impact and (2) be sure that the audience knows the speech is finished?

_____

_____

_____

Timing

Time your speech, using the outline to make a rough practice speech at home. Do it three or more times and calculate the average length.

Time _____

What can you do to stay within the time limit? If you need help, ask your instructor.

_____

_____

_____

Show this sheet to your instructor for helpful guidance.

ASSIGNMENT SHEET 6	*CAREERS*	**A-2**

Name _____ Score _____

OBJECTIVE 10

Give a presentation on a career in animal science.

INSTRUCTIONS

Oral Presentation

- Make informative presentations
- Use good speaking techniques
- Select/use words effectively
- Use effective body language
- Present appropriate appearance

A major part of every career in animal science is to work with people. Developing the confidence and skill to speak in front of a group will help you in any career.

Use your outline from Assignment Sheet 5 to prepare a 3-5 minute presentation. Your instructor will schedule a time for you to give the presentation to the class. Your speech will be evaluated using the following criteria.

Introduction

Got audience's attention

Related to audience

Clearly stated topic

Topic sufficiently narrow

Content and Structure

Main points were clear

Developed ideas logically

Used transitions

Summarized main points

Conclusion ended the speech clearly

Delivery

Could be heard

Willingness to share with the audience (confidence)

Eye contact

Physical expressiveness (face, gestures, movement, ease)

OBJECTIVE SHEET

PRIVATE AND GOVERNMENT AGENCIES, THEIR SERVICES, AND PROGRAMS A-3

INTRODUCTION

Both private and government agencies will have a tremendous impact on your career in the animal industry.

There are private agencies that will link you with people who share your professional interests, goals, and concerns. Other private agencies, which you won't join, may also affect your career. And, you may sometimes find yourself at odds with other private groups that have goals and interests different from your own.

Government agencies will regulate many aspects of your work. They'll also regulate the people who sell you feed and who buy your animals. Government agencies don't just tell people what to do, however. They also provide services. These agencies can help you buy a farm, operate day-to-day, and keep farming if disaster strikes.

PREREQUISITE

None

FOCUS ASSIGNMENTS

Reading Comprehension
- Gain factual information
- Analyze cause and effect
- Draw conclusions

Language
- Use standard grammar, spelling, and capitalization
- State ideas clearly

Composition
- Use complete sentences

FOCUS ASSIGNMENTS	
PREREADING:	Read *Federal Assistance Programs Retrieval System*, OSU Extension Facts No. 832.
WRITING:	Write a short essay (one paragraph to one page)on how to find information on Federal programs using the Federal Assistance Programs Retrieval System.

UNIT OBJECTIVE

After completing this unit, you will show the following competencies by mastering the activities on the Assignment Sheets and by scoring at least 85% on the Written Test.

SPECIFIC OBJECTIVES

1. Choose the word or phrase to complete statements about the development, structure, and current status of the USDA.
2. Discuss services and responsibilities of the Oklahoma Department of Agriculture.
3. Match specific governmental agencies with the services they provide.
4. Discuss major legislation affecting animal production.
5. Choose the word or phrase to complete statements about private agencies and their services.
6. Write a letter requesting information from a government or private agency. (Assignment Sheet 1)
7. Discuss new programs for research, conservation, production, and marketing.
8. Give an oral report on the actual and/or proposed effects of new programs. (Assignment Sheet 2)
9. Discuss the Farm Bill.

INFORMATION SHEET

PRIVATE AND GOVERNMENT AGENCIES, THEIR SERVICES AND PROGRAMS A-3

OBJECTIVE 1

Required Activities/ Resources
- Discussion

Optional Activities/ Resources in Instructor's Guide

Choose the word or phrase to complete statements about the development, structure, and current status of the USDA.

Discuss the question "What are some functions of the USDA today that were unheard of in the days when it was created?"

WORDS YOU SHOULD KNOW	
executive department	a division in the branch of government charged with putting into effect a country's laws
conservation	the official supervision of the use of natural resources in order to preserve and protect the resources
reorganize	restructure; change; organize anew
proposed	suggested; put forward for consideration

The United States Department of Agriculture (USDA) was created by an act of Congress on May 15, 1862. President Abraham Lincoln signed that act into law. Initially, the USDA had two specific purposes:

- develop the best seeds
- send the most helpful agricultural information to all farmers

On February 9, 1889, another act of Congress enlarged the powers and duties of the USDA:

- making it the eighth executive department in the federal government
- creating the Secretary of Agriculture position to be its administrator

In Lincoln's time, one American farmer raised enough to supply himself and three or four other people. Today, one farmer in this country supplies nearly 130 people, worldwide.

Like America's agricultural output, the USDA has grown a great deal over the years. It now has:

- some 100,000 employees
- the fourth-largest budget in U.S. Government

If the USDA was a corporation, instead of a government agency, it would be the fourth largest in this country. That would make it bigger than IBM, Mobil, or General Electric.

The credit and lending services of the USDA are equal to those of the largest banks in this country.

The USDA's areas of responsibility include:

- improving and maintaining farm income and production
- developing and expanding markets in other countries for U.S. agriculture
- helping to curb and cure poverty, hunger, and malnutrition
- enhancing and protecting the environment
- helping landowners protect the soil, water, forests, and other natural resources
- lending money to farmers and ranchers across America
- testing and researching in all areas of ranching, farming, conservation, and environmental protection
- inspecting and grading the quality of animals and food

More than one-half of the entire USDA budget goes to provide food stamps and nutritious meals to single parents and their babies and toddlers, disadvantaged people, the elderly, and school children.

The USDA is organized into 15 major divisions and 43 separate agencies.

A major reorganization of the USDA, to begin in 1995, has been proposed by the Secretary of Agriculture. This plan would:

- streamline department operations under six major mission areas
- reduce the number of existing USDA agencies from 43 to 29

Many of these proposed changes depend on the passage of measures currently before Congress. Therefore, it may be as late as mid-1995, or early in 1996 before it is known how much—and which parts— of the proposed reorganization will actually be implemented.

OBJECTIVE 2

Required Activities/ Resources
- Discussion
- Watch ODA video

Optional Activities/ Resources in Instructor's Guide

Discuss services and responsibilities of the Oklahoma Department of Agriculture.

Start your discussion with the question "Since there is a United States Department of Agriculture, why is there also a need for an Oklahoma Department of Agriculture?"

WORDS YOU SHOULD KNOW	
regulatory	to have the power to oversee or direct; to enforce standards or laws
consumer	a buyer; someone who uses a product consumption the use of goods
domestic	of or pertaining to a country's internal affairs or products
jurisdiction	the authority to interpret and apply, or enforce, the law, rules, or regulations
commodities	transportable agriculture products

The Oklahoma Department of Agriculture (ODA) was created in 1907 to serve as a regulatory agency. While it still serves in that capacity, today ODA's main focus is on its duties as a service agency.

As a service agency, the department has two general concerns: protecting consumers and promoting Oklahoma agriculture.

As a regulatory agency, the department enforces state laws that affect agricultural products. Enforcement must be effective and impartial, whether the products are purchased by farmers, ranchers, or consumers.

A five-member **State Board of Agriculture** oversees the duties and functions of the department.

- Board members are appointed by the Governor with the consent of the State Senate.
- Each member represents one of Oklahoma's five agricultural districts.

  ☞ **NOTE:** Only those Oklahoma Department of Agriculture divisions and services directly concerned with the animal industry will be discussed in this unit.

The **Agricultural Statistics Service** is a cooperative program between the ODA and the USDA. This program is responsible for:

- surveying farmers and ranchers for information on state livestock
- publishing those livestock survey results on a regular basis

Animal Damage Control Services (ADCS) is also a cooperative program between the USDA and the ODA.

- ADCS is responsible for controlling wildlife-related problems in order to protect:
  - human health
  - the state's agriculture
  - livestock

  Wildlife damage is usually controlled by reducing the number of wild animals who are causing the problems. Such animals include:
  - coyotes
  - beavers
  - some bird groups

Control activities are conducted only by request. All requests are investigated to verify that the problems have been caused by wildlife.

If the investigation indicates wildlife should be removed, animal damage specialists will provide one of the following:

- technical information on how to reduce the number of problem animals
- the actual control services

Animal Industry Services has two main functions:

- **Meat Inspection Services**

  Meat Inspection Services inspects the following through all phases of processing:

  - animals
  - meat
  - food products

  Meat Inspection Services also:

  - supervises and analyzes meat processors' sanitary practices and formulas
  - inspects and controls distressed items and products unfit for human consumption

    EXAMPLE: Truck wrecked animals

- **Animal Health Services**

  The Animal Health Service inspects livestock to control disease and parasites.

  Specifically, this department monitors and controls livestock diseases in the following places:

  - on farms and ranches
  - in auction markets
  - feedlots
  - other concentration points throughout the state

Other major concerns of this department include:

- controlling the use of vaccines
- preventing the spread of diseases that can be transmitted to humans

Market Development Services concentrates on the following:

- increasing the number of outlets for Oklahoma's agricultural commodities
- assisting producers, processors, wholesalers and retailers in marketing those commodities

Market Development Services is divided into three main sections:

- **International Market Development**

  International Market Development assists both buyers and sellers with information and technical advice on foreign trade. The coordinators in this section help to avoid barriers in:

  - trade
  - language
  - cultural differences
  - government regulations

- **Market News Section**

  The Market News Section is Oklahoma's official source of price information on agricultural commodities.

  An unbiased source, Market News works with the USDA and other state departments of agriculture across the nation. Market News provides the following on most of the state's main agricultural products:

  - current prices
  - current trends
  - information on supply and demand

- **Domestic Marketing Section**

  The Domestic Marketing Section is responsible for educating people in all 50 states about the desirability of Oklahoma products. This is accomplished through:

  - setting up farmer's markets
  - developing producer directories
  - attending trade shows
  - creating programs like "Made in Oklahoma"

    ☞ **NOTE:** The "**Made in Oklahoma**" program makes commodities produced, processed or packaged in this state easy for consumers to identify.

Almost anything dealing with the natural environment in this state, from fertilizers to feed yards, is under the jurisdiction of **Plant Industry and Consumer Services**.

The following duties are examples of those performed by Plant Industry employees.

EXAMPLES: providing USDA-licensed grading services on Oklahoma poultry and eggs; collecting samples from animal feed to check for possible diseases.

OBJECTIVE 3

Match specific governmental agencies with the services they provide.

Required Activities/ Resources – Discussion

Discuss the question "How would my life be affected by the elimination of one of these agencies?"

Optional Activities/ Resources in Instructor's Guide

WORDS YOU SHOULD KNOW	
standardization	establishing a basis by which something, in this instance an animal or animal product, can be measured and valued
quarantine	a strict isolation imposed to avoid the spread of disease
communicable diseases	illnesses that are easily transmitted
indemnity payments	compensation for damage or loss sustained, or expenses incurred

☞ **NOTE:** Only those agencies and services directly concerned with the animal industry will be discussed in this unit.

In 1935, during the Dust Bowl, the Resettlement Administration was created to help destitute farm families and to retire submarginal land from production.

Today, that same organization, now known as The Farmers Home Administration (FmHA), does the following:

- provides loans
- guarantees loans made by banks, credit unions, and savings and loans

To get a loan from FmHA, people must have:

- a reasonable chance for success
- been unable to get credit from private institutions at moderate rates

People eligible for loans from FmHa include:

- rural residents
- farm and ranch owners

FmHA provides financial assistance through the following:

- **operating loans** — for the owners of family-size farms who cannot get the credit they need from conventional sources. These funds may be used for equipment, livestock, feed, etc.
- **youth project loans** — for young rural residents between the ages of 10 and 20. These funds are meant to help members of 4-H Clubs, and other youth groups finance both agricultural and nonagricultural projects.
- **emergency loans** — for farmers and ranchers who own family-size operations and who have experienced losses from natural disasters.
- **farm ownership loans** — for the owners of inadequate or under-improved farms who want to enlarge or develop their operation. These are also available to individuals who hope to buy family-size farms and ranches.

- **loans to limited resource farmers** — for low-income farmers and ranchers to use in improving their operation so they can earn a better living.

- **soil and water conservation loans** — for farmers and ranchers, to assist them in developing, conserving, and making proper use of their land and other resources.

The Secretary of Agriculture established the **Agricultural Marketing Service** in 1972. Its services include:

- **market news** — unbiased information on all aspects of farm and ranch products (such as supply, demand, prices, etc.)

- **standardization, grading, and classing** — certifying the quality of products and live animals, based on standard levels of measurement; examples include AAA, AA, and USDA Choice.

- **research and promotion programs** — systems to monitor industry-sponsored research, promotion and information programs authorized by federal laws

- **transportation programs** — systems to efficiently transport agricultural products from the time they leave the farm and ranch gates, through all stages of processing and marketing

The Animal and Plant Health Inspection Service, another division of the USDA, conducts regulatory programs to protect and improve animal and plant health for the benefit of man and the environment. Its programs include:

- **Veterinary Services**

  - determines the existence and extent of outbreaks of communicable diseases and pests affecting livestock and poultry

  - certifies the health of exported livestock and poultry

  - inspects and arranges for the quarantine of imported animals and birds

- **Regulatory Enforcement and Animal Care** administers federal laws concerned with the humane handling and transportation of animals involved in interstate commerce, or which are intended to be sold wholesale.

- **Animal Damage Control** cooperates with states, counties, local communities and agricultural producer groups to reduce livestock problems caused by wildlife.

Established June 14, 1981, the **Food Safety and Inspection Service** regulates the meat and poultry industry to ensure products are:

- safe
- wholesome
- accurately labeled

The Packers and Stockyards Administration protects livestock and poultry producers in the marketing of livestock, meat, and poultry by maintaining:

- effective competition
- fair trade practices

Services offered by the **Agricultural Stabilization and Conservation Service** (ASCS) include the:

- **Dairy Refund Payment Program** — provides producers with refunds for price reductions in milk that occurred during the calendar year
- **Indemnity Program** — gives indemnity payments to dairy farmers whose milk was removed from the commercial market because it contained chemical or toxic substances (such as nuclear radiation or fallout)
- **National Security** — prepares plans and programs designed to protect food production, livestock, poultry feed, etc., in case of emergencies involving national security

The Soil Conservation Service (SCS) oversees a national soil and water conservation program. The SCS works in cooperation with:

- landowners and operators
- other land users and developers
- community planning agencies

- regional resource groups
- other federal, state, and local government agencies

The **National Agricultural Statistics Service** prepares estimates and reports on:

- production
- supply
- price of:
  - cattle
  - hogs
  - sheep
  - poultry
  - other related commodities

The **Oklahoma State University (OSU) Cooperative Extension Service** provides:

- educational programs
- practical answers, based on scientific findings, to questions about:
  - agriculture
  - the environment
  - family life
  - health and nutrition
  - rural development
  - economic development

Services provided throughout the state at **County Extension Offices**, include:

- **OSU Fact Sheets -**

  a series of short, concise, up-to-date publications. Five to ten new Fact Sheets are produced each month. Information is available on:

  - animal science
  - dairy management
  - insects
  - pesticide applicators training
  - poultry
  - range management
  - veterinary medicine
  - water quality
  - wildlife
  - several other areas

- **circulars**
- **videotapes**
- **a knowledgeable staff prepared to provide:**
  - videoconferences
  - workshops
  - demonstrations
  - field trips for schools

The **Food and Drug Administration** (FDA) is charged with protecting the health of the nation against impure and unsafe:

- foods
- drugs

- cosmetics
- other potential hazards

The FDA's **Center for Veterinary Medicine** develops and administers programs concerned with the safety and effectiveness of:

- animal drugs
- animal feeds
- feed additives
- veterinary medical products and devices

In turn, the FDA's **Center for Food Safety and Applied Nutrition**:

- conducts research
- develops standards regarding food:
  - safety
  - composition
  - quality
  - labeling

The Environmental Protection Agency (EPA) serves as the public's advocate for a livable environment. As such, it conducts environmental:

- research
- monitoring
- standard setting
- activity enforcement

Activities of the EPA include:

- controlling and regulating pesticides

- water quality control
- air pollution control

The **Occupational Safety and Health Administration** (OSHA):

- develops and oversees on-the-job safety and health standards
- develops and issues regulations
- investigates employers and inspects job sites to insure they comply with OSHA standards and regulations
- issues citations and proposes penalties for employers who don't comply

OBJECTIVE 4

Discuss major legislation affecting animal production.

Required Activities/ Resources
– Discussion

Optional Activities/ Resources in Instructor's Guide

Discuss the question "In what way, if any, has past legislation molded today's animal industry?"

WORDS YOU SHOULD KNOW	
act	a law; an enactment of a legislative body (in this case, Congress)
estuary	the wide lower course of a river where its current is met by the tides
packer	a wholesaler of meat products

The **Federal Clean Air Act** was created to enhance and protect the nation's air supply. One of its specific purposes is to help protect livestock from air pollution. This act directs the Secretary of Agriculture to:

- "encourage and support" continuing research on the effects of changes in the ozone upon animals, crops, and other plant life
- report to Congress every other year on the results of this research
- recommend legislation and EPA regulations to improve the air

The **Federal Water Quality Act** directs the EPA to work with:

- states

- the Secretary of Agriculture
- other federal agencies to:
  - prevent
  - reduce
  - eliminate

  pollution throughout the U.S. in:
  - lakes
  - rivers/estuaries
  - ground water

  This act makes special provisions for:
  - preventing
  - reducing
  - storing
  - collecting
  - treating
  - otherwise eliminating

    pollution from sewage in rural areas where soil conditions and other factors preclude the use of septic tank and drainage field systems.

    This act also directs the EPA to collect and disseminate scientific information on the effects of—and how to control—pesticides in water.

The **Packers and Stockyards Act** sets guidelines for livestock transactions. It establishes:

- the allowed activity of a stockyard dealer or market agency
- requirements for stockyard dealers to be registered and bonded
- the rights and responsibilities of dealers

- systems for setting rates, practices, and fees
- prevention of unfair, discriminatory, or deceptive practices in stockyards
- penalties for violating any provisions of this act

The **Federal Meat Inspection Act** does more than legislate the need to inspect meat and meat food products. It also requires:

- examining animals prior to their being slaughtered
- slaughtering diseased animals separately and examining their carcasses
- proper labeling and marking of meat
- the use of proper meat containers
- regulating and inspecting slaughter and packing businesses for sanitary conditions

OBJECTIVE 5

Choose the word or phrase to complete statements about private agencies and their services.

Required Activities/ Resources – Discussion

Begin your discussion with the question, "What private agencies have you had contact with through your animal projects?"

Optional Activities/ Resources in Instructor's Guide

WORDS YOU SHOULD KNOW	
association	an organized group of people with common goals; a society
registry	an organization that maintains copies of and records on a specific breed of animal and the genealogical records of individual members of that breed
cooperative	a business or enterprise that is owned and operated by a group for the mutual profit of everyone in that group
federation	a union of similar groups or associations

☞ **NOTE:** There are far too many private agencies that touch on the animal industry to include them all here. Therefore, only the largest or best known agencies, from various categories, have been listed in this unit.

Members of the **American Poultry Association** (APA) include standard-bred poultry breeders and exhibitors. The APA publishes a yearbook/registry and a quarterly newsletter. This society has established:

- standards for breeding and exhibiting purebred fowl
- standards and a code of ethics for poultry judges

The **Livestock Marketing Association** (LMA) represents livestock marketing businesses and livestock dealers. It offers:

- management services
- promotional services
- annual World Livestock Auctioneer Championships

The **American Agricultural Marketing Association** represents:

- the American Farm Bureau Federation
- 28 state farm bureau marketing associations

  Activities include:

  - agricultural bargaining
  - price determinations
  - negotiating contracts
  - providing market information, analysis, research, and assistance
  - giving educational and training programs
  - compiling statistics related to marketing and bargaining programs for livestock and poultry

The **National Milk Producers Federation** is made up of dairy cooperatives. It represents the major portion of all milk marketed by farmers. The federation presents awards for:

- outstanding cheese
- exemplary agricultural leadership

The **National Cattlemen's Association** represents 230,000 farmers, ranchers, breeders, and feeders of beef cattle. The NCA holds an annual convention with trade show and exhibits. It functions as the central agency of the beef cattle business for:

- national public information
- legislative relations

The **National Live Stock and Meat Board** is a coalition of livestock and red meat organizations. Its focus is on protecting and building demand for red meats and meat products, including: beef/veal, pork, lamb, and processed meats. Toward that end it brings together every segment of the meat industry to work on common goals and challenges. Those involved with the Meat Board include:

- producers
- marketers
- packers
- processors
- retailers

The **Beef Industry Council** (BIC) represents companies and individuals engaged in the feeding and production of cattle or the packing and processing of meat. It seeks to enhance public demand for beef and beef products. BIC activities include:

- promoting beef as part of the nation's diet
- disseminating information
- conducting research

- maintaining a library on meat sciences and nutrition that includes:
  - books
  - periodicals
  - clippings
  - artwork
  - monographs
  - business records
  - archival material

The **National Livestock Council** represents organizations for breeders of beef and dairy cattle, horses, swine, sheep, and goats. Member organizations:

- register pedigrees of animals
- maintain records of ownership
- foster breed improvement

A cooperative for agriculture lending institutions, the **Farm Credit Council** also acts as a central bank for cooperatives. It:

- monitors legislative activities
- lobbies
- acts as government liaison for agricultural lending institutions

People for the Ethical Treatment of Animals (PETA) is a 370,000- member activist group opposed to all forms of cruelty to animals. PETA considers the slaughter of animals for human consumption cruel. To fight this practice it:

- produces documentary films, slides, and pictures of conditions in slaughterhouses
- conducts rallies and demonstrations to focus attention on this issue

The **Humane Farming Association** is comprised of individuals and groups. It produces educational material on practices it considers inhumane. These practices include:

- some breeding and farming practices
- factory farming
- genetic engineering
- slaughterhouses

The **Humane Society of the United States** promotes public education to foster respect, understanding, and compassion for all creatures. It works to:

- eliminate the abuse of animals in movies, television, and competitive events
- stop cruelty in the raising, handling, and transportation of animals used for food
- address critical environmental issues in terms of their impact on animals and humans
- conduct workshops and seminars for individuals who work with animals

As it's name implies, the **American Society for the Prevention of Cruelty to Animals** (ASPCA) seeks to prevent cruelty to animals. Towards that end it:

- enforces all laws for the protection of animals
- promotes appreciation for and humane treatment of animals
- campaigns for legislation to improve animal welfare
- offers national and international legislative, consulting, and educational programs
- maintains a library resource center with books, periodicals, films, and animal-related information

The **National Pork Producers Council** is a federation of state pork producer associations. It promotes the pork industry through:

- research programs
- consumer education
- lobbying activities
- a library of books and publications concerning swine, pork, food, and agriculture

Producers of sheep and wool belong to the **American Sheep Industry Association** (ASI). The group's goal is to advance the standards and profitability of the sheep industry. ASI conducts lobbying activities to promote legislation beneficial to the industry.

OBJECTIVE 6

Complete Assignment Sheet 1.

OBJECTIVE 7

Discuss new programs for research, conservation, production, and marketing.

Required Activities/ Resources
- Discussion

Discuss new programs you have read about in magazines or newspapers.

Optional Activities/ Resources in Instructor's Guide

WORDS YOU SHOULD KNOW	
depreciable	something that lowers in value as it is used or ages
genetics	the study of hereditary composition and variations
genetic engineering	altering an organism's natural genetic structure or composition

Market Development Services for the Oklahoma Department of Agriculture (ODA) is looking beyond this state. In fact, it's looking beyond the U.S.

- Market Development plans to go more global with its programs.

  EXAMPLES: cattle trade missions are planned for Malaysia and Mexico

- Many future marketing efforts (both domestic and international) will entail cost-sharing with private companies.

The **Oklahoma Beginning Farmer Loan Program** is a joint project between ODA and the Oklahoma Development Finance Authority. This program:

- provides low-cost financing for farm loans
- is designed to encourage young people to establish family-size farms
- is only available for people who:
  - are residents of Oklahoma
  - have a net worth of less than $200,000
  - have never before held direct or indirect ownership interest in substantial farmland
  - are educated or experienced in the type of farming operation for which the loan is sought
  - are not buying from a closely related person
  - agree to participate in a farm management program for at least the first five years of the loan
  - have access to adequate working capital
  - are not refinancing existing debt

  Beginning Farmers Loans may be used for:

  - purchasing farmland
  - improving land
  - buying or constructing farm buildings
  - acquiring depreciable farm machinery and equipment
  - buying livestock for breeding purposes

  These loans are:

  - financed by the sale of federally tax-exempt bonds

- provided by participating lending institutions and private lenders
- available to qualified borrowers for up to $250,000

- Partnerships are eligible, if all partners meet the requirements.
- Corporations are not eligible.
- Applications for the program can be obtained from local lending institutions and the Oklahoma Development Finance Authority.

The Soil Conservation Service is now conducting two pilot projects in Oklahoma. These projects both involve **manure storage** for dairies. The projects consists of:

- building structures for storing manure
- eventually using the stored manure as fertilizer in fields

These manure storage projects help farm and ranch operations by:

- protecting local water quality by preventing waste runoff into the water supply
- cutting fertilizer costs
- reducing the loss of nutrients in the manure
- being constructed in a way that allows the waste to be pumped out onto adjacent fields, when needed

- Information learned from these pilot projects will be given to other conservation districts and to private industry.
- Similar storage facilities can be used in the pork industry.

A lot of research is being done today around **embryo transfers**. This is also known as **genetic engineering**.

Most of this research has been conducted on dairy cattle. However, what has been— and will be—learned can also be applied to other species.

The four practical uses for genetic engineering in animals currently planned for the future, include:

- **Increasing growth and feed efficiency** — studies show that giving animals growth hormones is resulting in the animals:
  - growing 10 to 20 percent faster
  - requiring up to 30 percent less feed
- **Improving body composition** — similar studies show animals who were given extra growth hormones also had:
  - up to one-third less fat
  - up to 10 percent more muscle
  - less fat not only in their bodies but also in their milk and eggs
- **Making the animal resistant to disease** — genes from an infectious organism may now be inserted into animal germ lines. This can make the animal genetically immune to the infection.

  Scientists plan to use this method to fight the following type of infections:

- respiratory
- enteric viral
- bacterial
- parasitic
- **Producing natural products** — using animals to produce valuable foreign proteins. One such successful experiment involved making sheep produce the human blood clotting factor IX in their milk.This proved more efficient than manufacturing the substance by other means.

OBJECTIVE 8

Complete Assignment Sheet 2.

OBJECTIVE 9

Required Activities/ Resources
– Discussion

Optional Activities/ Resources in Instructor's Guide

Discuss the Farm Bill.

? Discuss specific parts of the Farm Bill that will have an effect upon your community.

WORDS YOU SHOULD KNOW	
depression	a period of drastic decline in the national economy
omnibus	including many things; covering many situations at once

"Farm bill" is a nickname for an omnibus piece of legislation passed by Congress every three to five years. These Acts of Congress are concerned with:

- every aspect of agriculture
- rural development
- solutions to rural and agricultural crises

The Agricultural Adjustment Act of 1933 was the first formal "farm bill." Congress passed this act at the request of President Franklin D. Roosevelt, who wanted legislation that would "increase the purchasing power of our farmers and the consumption of articles manufactured in our industrial communities."

Passage of the Agricultural Adjustment Act had become necessary because of the steady decline in farm income throughout the 1920s, following the collapse of agricultural prices in 1920. In 1919, farmers averaged $2.16 per bushel of wheat; but only $1.03 per bushel in 1921. This extreme drop in price was due, in large part, to a sudden decline in export demand.

Farming in many European countries had been disrupted during World War I. Following the war, U.S. farmers helped feed the hungry citizens of those countries. By 1920, most European farmers had recovered enough to start providing the produce for their own countries, once again.

Throughout the 1920s, U.S. farm prices went up and down, but the trend was always down. The situation was made worse because although farm prices were dropping, the price of nonagricultural goods, and the wages in other industries, remained the same. This created a gulf between farm income and farm costs, resulting in a depression in the farming industry.

Since over one-fourth of the U.S. labor force worked in agriculture at that time, a depression in the farming industry began to have a profound affect on the economy of the entire country. Many people believe the farm depression was the root cause of the Great Depression, which followed the stock market crash of 1929.

The Agricultural Adjustment Act, signed into law by President Roosevelt on May 12, 1933, gave the Secretary of Agriculture authority to:

- reduce farm size or production through voluntary agreements
- enter into marketing agreements with processors to control the prices paid to farmers and ranchers
- license processors and others to help eliminate unfair practices
- provide rental or benefit payments to farmers
- spend money to expand markets or remove surpluses

Primarily, the Agricultural Adjustment Act of 1933 was aimed at improving the financial situation of the average American farmer. Agencies and laws that followed were designed to solve particular farm problems.

More recent farm bills have created the following:

- government commodity programs for such crops as wheat, feed grains, and cotton
- enhanced export support programs
- market promotion programs
- environmental and conservation programs
- wetlands protection programs
- water quality programs

- support and funds for research and agricultural extension programs
- rural development programs

Each farm bill establishes government spending limits for agricultural programs, during the life of that particular bill. For example, the 1985 Farm Bill (the Food Security Act) established the amounts the government could spend on agriculture-related programs from 1985 through 1990, when the next farm bill was developed.

Farm bills also set, for the life of each bill, limits or guidelines for the following:

- target prices for major commodities
- government farm loan interest rates
- credit requirements
- farm deficiency payments
- crop insurance provisions
- government crop support programs
- food stamp aid
- rural development assistance programs
- funding for research and extension programs

Two pieces of legislation—the Food, Agriculture, Conservation and Trade Act of 1990 and the Agricultural Reconciliation Act of 1990—actually make up the 1990 Farm Bill, which is currently in effect. The 1990 measure was designed to cover a five year period. As a result, it should be succeeded by the 1995 Farm Bill.

To date, the 1990 Farm Bill has spent an approximate total of $50 billion on commodity-related programs.

It is anticipated that future U.S. farm policy will be increasingly concerned with farm cost and profitability factors, protecting the environment, and conserving natural resources.

ASSIGNMENT SHEET 1	*PRIVATE AND GOVERNMENT AGENCIES, THEIR SERVICES AND PROGRAMS* **A-3**

Name _____ Score _____

OBJECTIVE 6

Write a letter requesting information from a government or private agency.

EQUIPMENT AND SUPPLIES

- writing paper and envelopes
- two stamps
- a computer, typewriter, or ink pen (blue or black ink only)

INSTRUCTIONS

Research and Reference
- Locate resources

Language
- Use standard grammar, spelling, and capitalization

Functional Writing
- Write letters

1. Locate the address of the organization you plan to write.
2. Make a list of what you want to learn and why.
3. Write the date, your return address, and the heading of the letter in the following manner:

   Date, Year

   Your Address
   Your City, Oklahoma Zip Code

   Name of the Organization
   Its Address
   City, State Zip Code

   Dear (title of the person you are writing)

   EXAMPLES: Dear Personnel Officer; Dear Public Information Officer; Dear Research manager, etc.

4 Write the body of the letter, which should include:

   A. what you want to know

   B. where they should send the information

   C. how they can contact you, if necessary

D. If there is a charge, say how much money you are sending and in what form (check or money order, it's never wise to send cash through the mail).

E. Indicate you are sending a self-addressed, stamped envelope (you can just write SASE).

F. Thank them for their assistance in this matter.

5. Skip two lines and write a closing (*Sincerely, Very truly yours, or Yours truly*) and sign the letter. If you are typing the letter or writing it on a computer, leave three blank lines and then type your name. Sign in the space between the closing and where your name is typed.

6. Put your name and address in the upper-left hand corner of two envelopes.

7. Address the first envelope to yourself and put a stamp on it.

8. Address the second envelope to the person you are writing and put a stamp on it.

9. Neatly fold the letter and the envelope addressed to you. Seal them both in the second envelope.

10. Mail the letter.

11. Mark which date you mailed the letter on your calendar. Then mark the date four weeks from when you mailed your letter. If you have not received a response by that time, send a second letter.

12. When you receive an answer, write a thank-you letter in the following manner:

A. Begin, again, with your return address and the heading.

B. Write the greeting, using the title and last name of the person who sent you the information (i.e., *Dear Dr. Williams, Dear Ms. Jones, Dear Mr. Snipes*).

C. Write a short paragraph thanking the sender and indicating how the information will be used.

D. Write a closing and sign the letter (as in step 5, above).

16. Address the envelope; put your address in the upper, left-hand corner; stamp the envelope; and mail it.

ASSIGNMENT SHEET 2	*PRIVATE AND GOVERNMENT AGENCIES, THEIR SERVICES AND PROGRAMS* **A-3**

Name _____ Score _____

OBJECTIVE 8

Give an oral report on the actual and/or proposed effects of new programs.

EQUIPMENT AND SUPPLIES

- note cards
- resources and references

INSTRUCTIONS

Research
- Use note cards

Oral Presentation
- Make informative presentations
- Use good speaking techniques

1. Select a topic.

   Decide which new program you are going to cover. It might be one of those listed in the Information Sheets for objective 7. However, you may want to contact your county extension office or a division of the USDA, ODA, or the OSU Animal Science Department and learn of other new programs. Be careful to choose a program you can learn enough about to give a complete report.

2. Research the topic.

   Since you are giving a report on new programs, you are unlikely to find much material at your local or school library, other than magazine or newspaper articles. Contact OSU, your county extension agent, or people in the division of the ODA or the USDA that oversees the program you've selected. Ask to interview them and also ask for any written information (fact sheets, pamphlets, brochures, etc.) that exists on the program.

3. Take notes.

   Write each fact on a separate note card.

4. Arrange the note cards in order.

   Move the cards around until the information seems to flow logically.

5. Write an introduction.

   Your opening statement should get the audience's attention and tell them what you are going to talk about.

6. Write the body of the speech.

   The body of your speech should contain your main points. Each main point should be supported by facts, statistics, or direct quotes from an expert.

7. Write your conclusion.

   Your conclusion should make your point in one, easy to understand sentence.

8. Practice making the speech.

   A. Time yourself. Make sure your report lasts the assigned length of time.

   B. Don't write out your whole speech. It will sound stiff. Instead, memorize your introduction and conclusion, look at the facts on your note cards and put everything in your own words.

OBJECTIVE SHEET

SELECTING AND BREEDING LIVESTOCK

B-1

INTRODUCTION

Good or poor selecting and breeding are directly related to your economic return.

Efficient and successful breeders keep accurate records on their animals. Good records will enable you to improve your stock by concentrating on strengths and eliminating weaknesses.

A number of different breeding systems have been established, based on genetic advances. Who knows about inbreeding, grading up, genes, estrus, sex determination, and genetic engineering? Simple. The stock manager who drives a new truck every year!

PREREQUISITE

None

FOCUS ASSIGNMENTS

Reading Comprehension
- Gain factual information
- Analyze cause and effect
- Draw conclusions

Language
- Use standard grammar, spelling, and capitalization
- State ideas clearly

Composition
- Use complete sentences

FOCUS ASSIGNMENTS	
PREREADING:	Read *Inbreeding in Swine*, by David S. Buchanan and Archie C. Clutter, OSU Extension Facts No. 3606 and *Swine Crossbreeding Systems*, by David S. Buchanan and William G. Luce, OSU Extension Facts No. 3603.
WRITING:	Write a short essay (one paragraph to one page) describing why crossbreeding is used by the majority of producers across the nation.

UNIT OBJECTIVE

After completing this unit, you will show the following competencies by mastering the activities on the Assignment Sheets and by scoring at least 85% on the Written Test.

SPECIFIC OBJECTIVES

1. Choose the word or phrase to complete statements about selecting and breeding livestock.
2. Choose the word or phrase to complete statements about selecting livestock for desirable characteristics.
3. Discuss basic genetic principles.
4. Match types of livestock to their numbers of chromosome pairs.
5. Choose the word or phrase to complete statements about how genetic characteristics are transmitted.
6. Discuss inherited traits and heritability.
7. Discuss sex determination and sex-linked traits.
8. Draw a diagram showing the inheritance of horns in cattle for the F_1 and F_2 generations. (Assignment Sheet 1)
9. Determine color inheritance of offspring. (Assignment Sheet 2)
10. Estimate possible gene combinations using the Punnett Square method. (Assignment Sheet 3)
11. Match abnormal genetic conditions to their descriptions.
12. List factors affecting fertility.
13. Choose the word or phrase to complete statements about Expected Progeny Difference records (EPDs).
14. Analyze Expected Progeny Difference (EPD) records and performance records. (Assignment Sheet 4)
15. Select from a list true statements about production testing.
16. Calculate percentage calf/lamb crop. (Assignment Sheet 5)
17. Discuss a specific advance in genetic engineering.
18. Match mating systems to their descriptions, advantages, and disadvantages.
19. Select mating methods. (Assignment Sheet 6)
20. Define breeding periods.
21. Choose the word or phrase to complete statements about estrus.

22. Match farm animals to their normal estrous cycles.

23. Identify points in time on an estrous cycle chart. (Assignment Sheet 7)

24. Determine the proper times for breeding. (Assignment Sheet 8)

25. Choose the word or phrase to complete statements about heat synchronization.

26. Match livestock to their gestation periods.

27. Discuss methods of selecting poultry.

INFORMATION SHEET

SELECTING AND BREEDING LIVESTOCK

B-1

OBJECTIVE 1

Optional Activities/Resources
- Video
- Invite a vet or a stock manager to discuss the importance of selecting and breeding livestock.
- Visit a breeding facility.

Choose the word or phrase to complete statements about selecting and breeding livestock.

Discuss the question, "What are some of the consequences of good selection and poor selection?"

WORDS YOU SHOULD KNOW	
EPD (Expected Progeny Difference)	a prediction of how future progeny will perform; EPDs are records of specific traits published by breed associations
estrous cycle	cycle where eggs are produced and mature until they are capable of being fertilized
estrus	the period of the estrous cycle when the female is receptive to the male for breeding; also referred to as "in heat"
gestation period	the period of time that a female is pregnant
progeny	offspring

- The primary purpose of selecting and breeding is the production of high-quality, cost-effective animals that are demanded by the consumer.

  ☑ **NOTE:** Different producers require different breeds. No one breed is best for all producers.

- Factors to be considered when selecting a breed of animals include:
  - the market demand
  - the type of operation
  - the cost and availability of good breeding stock
  - the quality and quantity of available feedstuffs

- the regional conditions
- personal preference

- Factors that determine which animals to breed are based on standard or ideal. Factors include:
  - reproductive performance of the mating males and females
  - longevity of breeding capability
  - growth rate of progeny
  - efficiency of gain of progeny
  - carcass merit of developed progeny

- A basic understanding of genetics enables you to estimate the characteristics that will be passed to the progeny. Characteristics such as color and size can be passed from one generation to the next.

  ☞ **NOTE:** Advances in biotechnology are making it possible to read and manipulate genetic code.

- Expected Progeny Difference (EPD) is used to determine the breeding value of bulls. The primary EPD traits include:
  - birth weight
  - weaning weight
  - yearling weight
  - maternal influence
  - milking ability

- Accurate record keeping is critical when selecting and breeding animals.

  ☞ **NOTE:** Records are used to make informed decisions.

- The quality of the animals selected for breeding will directly affect the quality of the herd,

- Animals not meeting breeding standards should be culled.

- **Primary types of breeding**
  - **purebred breeding** – mating of purebred animals of the same breed
  - **crossbreeding** – mating two animals of different breeds
- **Mating methods**
  - **hand mating** – Hand mating involves placing one female and one male in a closely confined area. The female is released into the pasture after being bred. The male only mates with the female once.
  - **pen mating** – Pen mating involves confining a few females with one male. The females are released after a period of time. Efficiency is reduced because the male might mate with a female more than once.
  - **pasture mating** – Pasture mating involves placing a male with a large number of females in a pasture for a period of time. Efficiency is reduced because the male might mate with a female more than once. Additionally, the risk of injury is higher than in hand mating or pen mating.
  - **artificial insemination** – Artificial insemination requires a qualified technician. The technician inseminates the female using the previously collected sperm of a selected male. Artificial insemination is time consuming. The benefit is derived from the efficient use of quality sperm.

    ☞ **NOTE:** Artificial insemination will be covered in Unit B-3.
- **The timing of mating is a critical factor when breeding because:**
  - Females are receptive to mating only during the estrus (heat) portion of the estrous cycle.
  - Conditions during the gestation period affect offspring survivability.
  - Weather conditions at the time of birth may have a significant impact on offspring survivability.

OBJECTIVE 2

Optional Activities/Resources
- Video or other media presentation
- Visit a meat packing facility and observe the processing of market animals.

Choose the word or phrase to complete statements about selecting livestock for desirable characteristics.

WORDS YOU SHOULD KNOW	
conformation	the amount of muscle development; the animal's body shape and balance
performance data	data that measures an animal's growth, such as birth rate, weaning weight, yearling weight, and mature weight
preconditioning	the process of preparing calves for the stress of being moved into the feedlot

- You must take considerable care in choosing both the male and the female in breeding. You must also continually evaluate the progeny to correct weaknesses in your stock.
- A male is mated to several females. The male contributes fifty percent of the genetic makeup to the offspring. Use high-quality males that overcome the weaknesses of the stock. Select females that will improve the quality of the stock.
- Selection decisions depend on the needs of the facility. Different criteria are used for choosing breeding stock, replacement stock, and market stock.
- Animals not meeting breeding standards should be culled.
- **Criteria for selecting breeding females**
  - health
  - reproductive efficiency
  - longevity
  - individuality or type
  - constitution and age
  - conformation and size

- **Criteria for selecting breeding males**
  - ☐ has traits to overcome weaknesses of herd
  - ☐ shows good type (excellent muscle development, frame or skeletal size, structural soundness in feet and legs, and body capacity)
  - ☐ has appropriate pedigree data
  - ☐ has strong performance data
  - ☐ shows signs of fertility
  - ☐ has appropriate progeny records
- **Criteria for selecting the number of replacement females**
  - ☐ the reproductive rate of the existing females
  - ☐ the age of the existing females
  - ☐ the loss of females from natural causes or from culling
- **Criteria for selecting replacement females**
  - ☐ be free from disease and inherited defects
  - ☐ have good constitution and conformation
  - ☐ be the best females from the herd
  - ☐ be evaluated carefully during each breeding season
- **Criteria for selecting market animals**

  ☑ **NOTE:** The criteria for market animals are similar to those for breeding animals. Feed conversion is a critical factor.
  - ☐ be free from disease
  - ☐ have good conformation
  - ☐ have high feed efficiency

- ☐ be preconditioned (documented on a Preconditioning Certificate)
  - ▸ castrated, dehorned, and branded or tattooed
  - ▸ vaccinated
  - ▸ weaned four to six weeks before sale
  - ▸ trained to eat solid feed from bunks and to drink water from water tanks
  - ▸ treated for parasites

OBJECTIVE 3

Discuss basic genetic principles.

Required Activities/Resources
- Transparency Masters 1, 2, and 3
- Study objectives 3, 4, 5, and 6 together.

Optional Activities/Resources
- Let students view a cell, egg, and sperm under a microscope.
- Video or other media presentation

You will see transparencies on parts of the cell, mitosis, and meiosis.

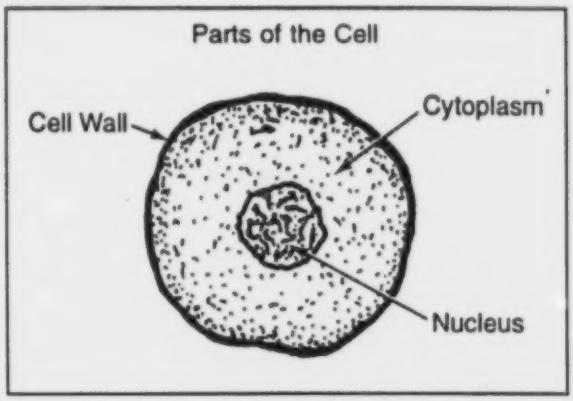
WORDS YOU SHOULD KNOW	
chromosome	a linear body of the cell nuclei containing DNA and responsible for the determination and transmission of hereditary characteristics; chromosomes are always in pairs
DNA (deoxyribonucleic acid)	a protein-like genetic material on genes and chromosomes that controls inheritance; a DNA molecule is made up of two strands in the form of a double-helix (you create a double-helix when you twist a rubber band several times)
fertilization	the union of a sperm cell with an egg cell
gene	a complex molecule, located on a chromosome, that is involved in the transmission of inherited traits; genes are always in pairs
genetics	the study of heredity, or the way in which traits of the parents are passed to the progeny
heritability	the probability that characteristics (traits) will be passed from the parent to the offspring
heritable trait	characteristics that can be passed from one generation to the next
meiosis	cell division where chromosome pair is split
mitosis	cell division where chromosome pairs are duplicated in each new cell

Traits are passed from the parent to the offspring through the chromosomes located in the sperm and egg.

- The cell is the first level of reproductive and genetic growth. In the center is the nucleus, made of protoplasm. The nucleus

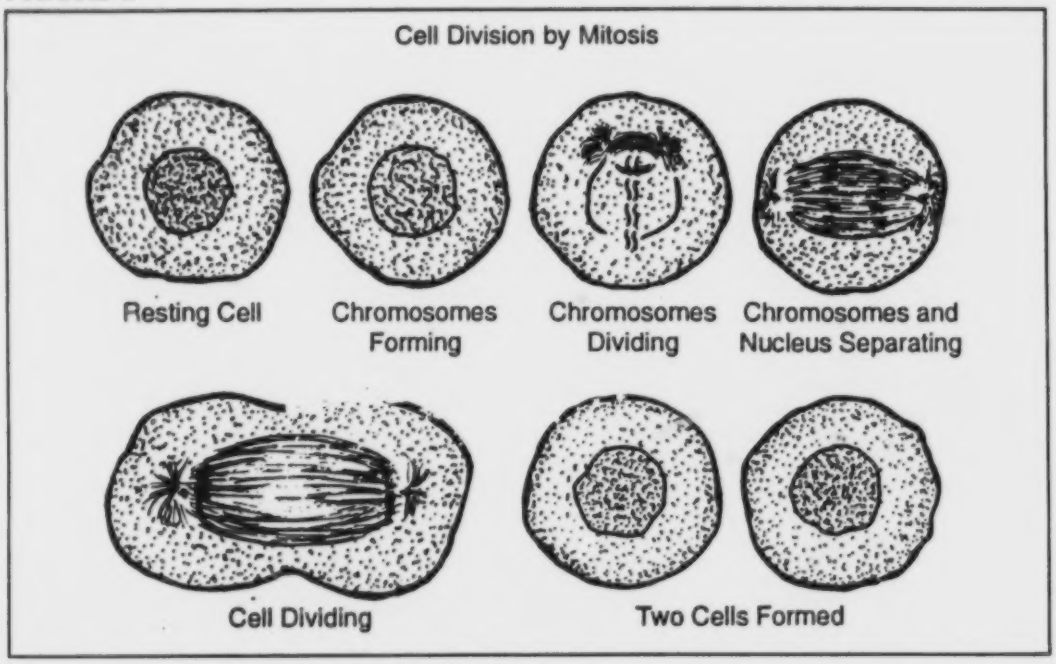
enables the cell to grow, digest food, and divide. It is surrounded by a fluid, cytoplasm. The cytoplasm and nucleus are contained within the cell wall. (Figure 1)

FIGURE 1



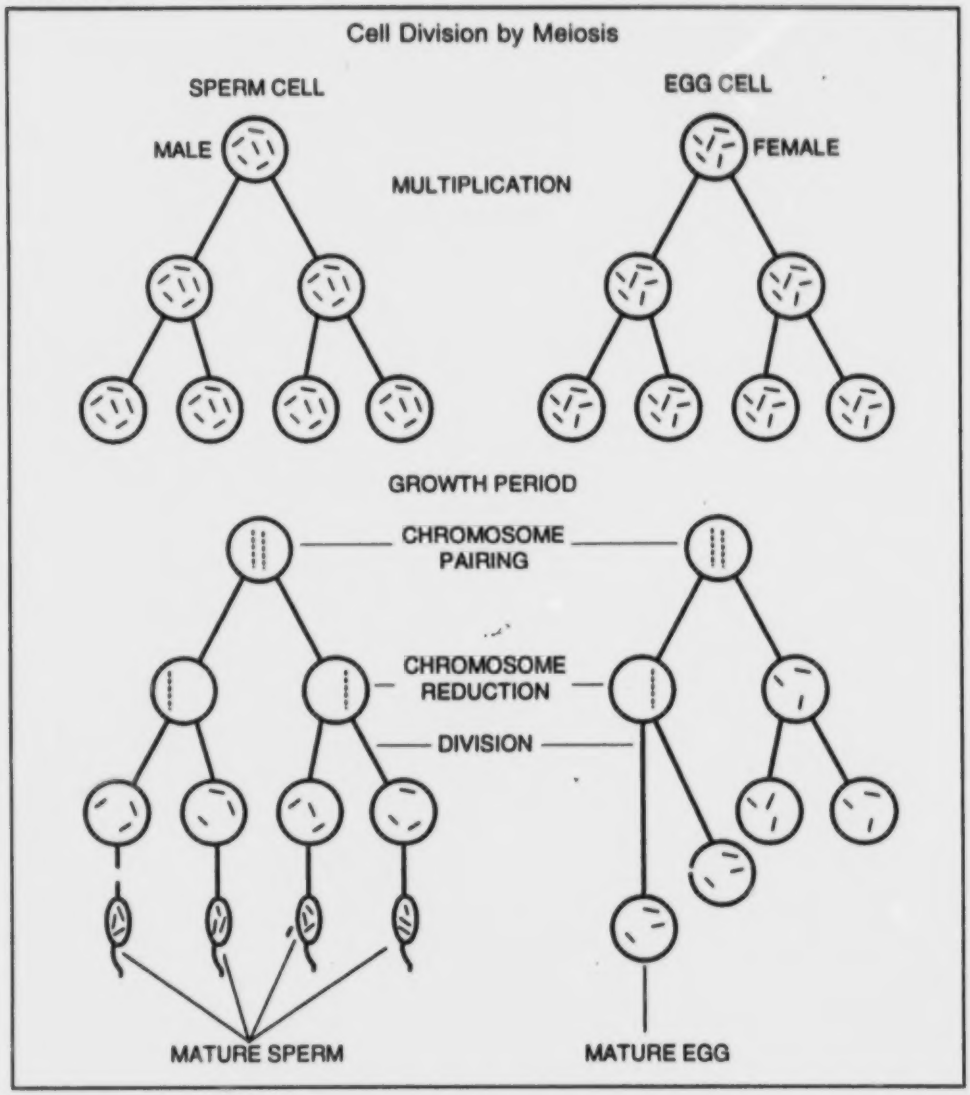
- Chromosomes, located inside the nucleus, carry hereditary material in subunits called genes. Genes control animal traits such as color and height.
- Animals grow through a process of cell division called mitosis. In mitosis, one cell divides into two identical cells. (Figure 2)

FIGURE 2



- Reproductive cells are called gametes. They are formed during cell division by meiosis and contain only one chromosome of a pair. (Figure 3)

FIGURE 3



- Fertilization occurs when the male gamete (sperm) joins with the female gamete (egg). The two gametes join to form one complete cell where the chromosomes are paired.

☑ **NOTE:** Many different combinations of traits occur when the egg is fertilized.

- The fertilized egg grows through mitosis cell division. The genes will determine some of the animal's traits. The environment will also affect the development of the egg.

  EXAMPLE: An animal that is not fed properly will suffer the effects of malnutrition and the fetus will not develop fully.

- Two events can happen during meiosis that affect the genes in each gamete.

  - **Crossover** is caused when the chromosome pair crosses over and splits. Crossover allows a limitless number of new combinations for the new chromosome.

  - **Mutations** cause genes to change. For instance, radiation will cause mutation. The new gene can be passed to offspring. Some mutations are beneficial, some are harmful.

OBJECTIVE 4

Optional Activities/Resources
- Look up number of chromosome pairs in rodents, insects, fish, and birds.

Match types of livestock to their numbers of chromosome pairs.

The number of chromosome pairs for different species is as follows:

☑ **NOTE:** No two animals (except identical twins) have the same genetic makeup.

- cattle 30 pairs
- swine 19 pairs
- sheep 27 pairs
- chickens 6 pairs
- humans 23 pairs

OBJECTIVE 5

Optional Activities/Resources
- Have students research other dominant-recessive traits.
- Video

Choose the word or phrase to complete statements about how genetic characteristics are transmitted.

WORDS YOU SHOULD KNOW	
dominant gene	one of a pair of genes which hides the effect of the other gene in the pair
polled	without horns
recessive gene	one of a pair of genes, the effect of which is hidden by the dominant gene in the pair

- Inherited traits (color, size, growth rate, being horned or polled, and carcass traits) are controlled by genes.
- Genes, like chromosomes, are always in pairs.
- Inherited traits are either controlled by one pair of genes or by more than one pair of genes.
  - Color is controlled by one pair of genes.
  - Growth rate is controlled by only a few pairs of genes.
  - Carcass traits are controlled by many pairs of genes.
  - Feed efficiency is controlled by many pairs of genes.
- The two types of genes are:
  - dominant genes
  - recessive genes
- Gene pairs are written using a capital letter for the dominant gene and a lower-case letter for recessive genes.

  If the dominant gene for swine color produces white coloring, and the recessive gene produces non-white coloring, the following gene pairs are possible:
  - WW produces white color – both genes are dominant, the dominant color is white
  - Ww produces white color – the dominant gene suppresses the recessive gene

- ww produces non-white color – both genes are recessive, the recessive color is non-white

- Incomplete dominance occurs when neither gene is totally dominant over the other. The result is a mixture of the two traits.

OBJECTIVE 6

Discuss inherited traits and heritability.

Required Activities/ Resources
- Transparency Masters 4, 5, and 6

Optional Activities/Resources
- Talk to a stock manager about how animals are bred for specific traits.

You will see transparencies on inheritance of color, inheritance of horns, and hereditary characteristics.

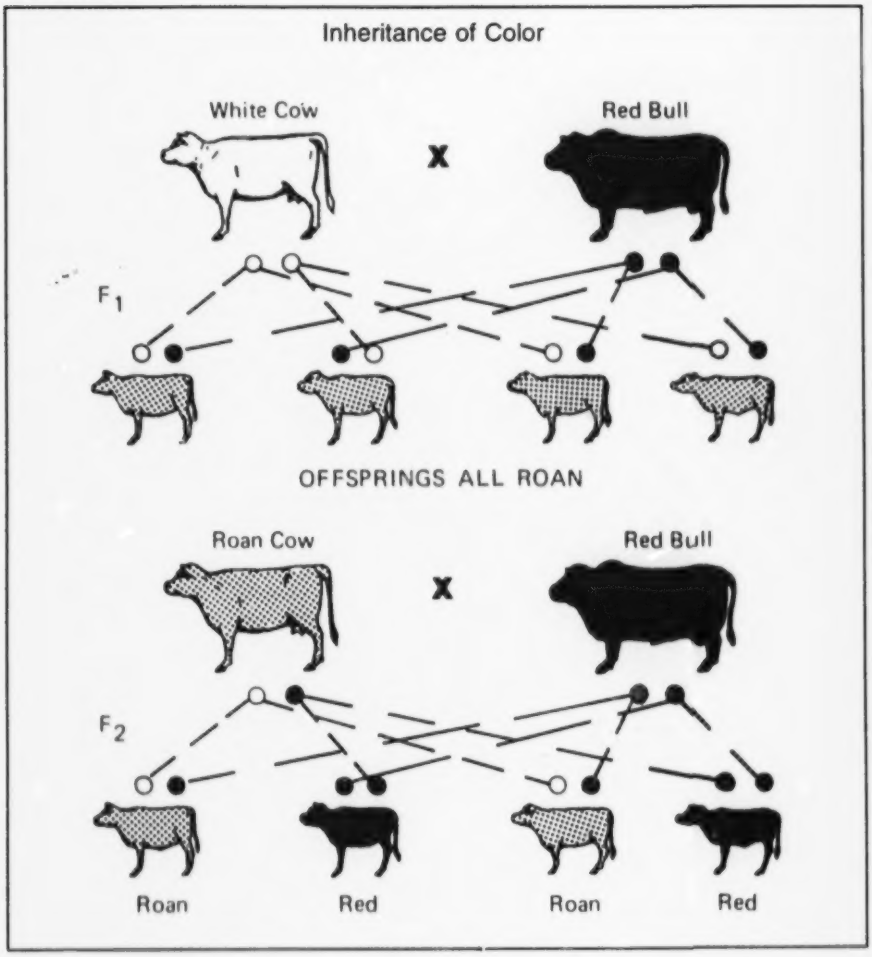
WORDS YOU SHOULD KNOW	
F_1	the offspring from the first crossbreeding
F_2	the offspring from the second crossbreeding, using an offspring from the F_1 generation

- The following terms are used to describe genetic makeup:
  - **genotype** – Genotype refers to the genetic makeup: the pairs of genes that an animal possesses.
  - **phenotype** – Phenotype refers to the physical appearance of an animal.
- Stock managers use genotype and phenotype information when selecting and breeding animals and when culling animals.
  - EXAMPLE: The dominant gene for Angus cow color produces black coloring. The recessive gene for Angus cow color produces red coloring. Figures 4 and 5 show inheritance of color and horns.

gene pair	genotype	phenotype
BB	BB	Black coloring
Bb	Bb	Black coloring
bb	bb	Red coloring

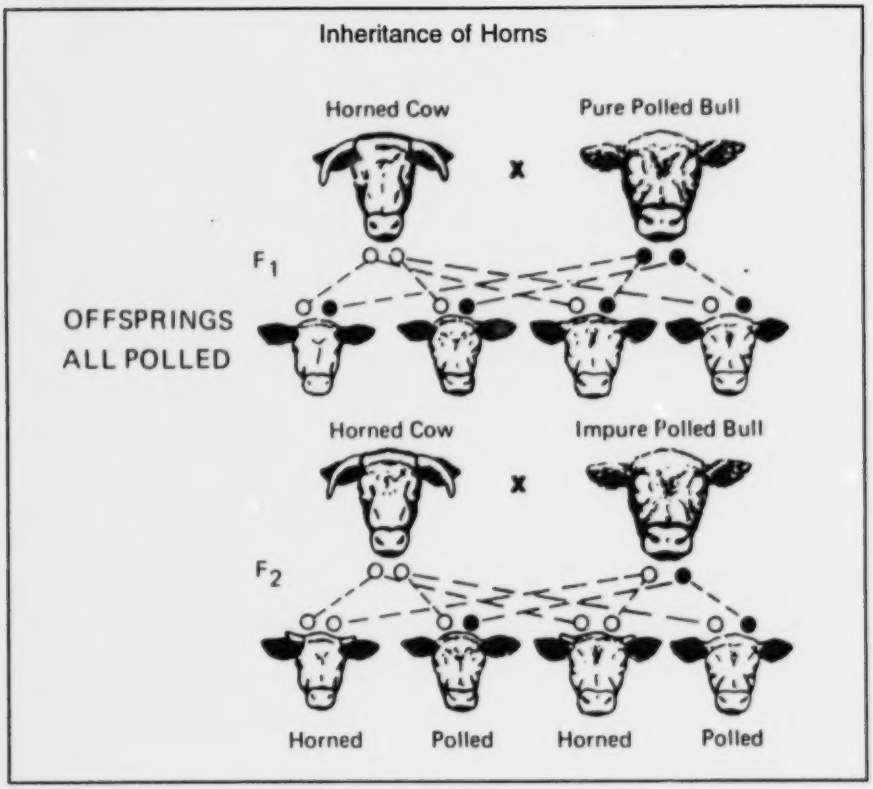
- inheritance of color (Figure 4)

FIGURE 4



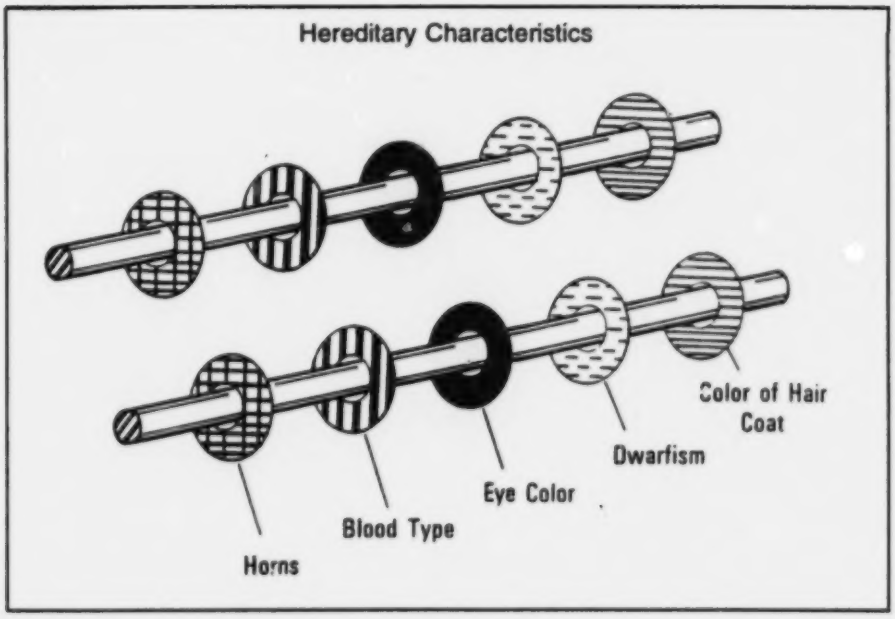
- inheritance of horns (Figure 5)

FIGURE 5



- hereditary characteristics – Figure 6 shows examples of heritable traits as genes on a strand of DNA.

FIGURE 6



- Different traits have different levels of heritability (how likely the trait will be passed to offspring).
- Heritable estimates indicate the likelihood that a trait will be passed to the offspring.

  ☞ **NOTE:** Careful consideration of heritable factors will increase the probability of selecting profitable animals.

- Tables 1-5 show the heritability of certain traits.

TABLE 1 **SWINE**

TRAIT	HERITABILITY(%)
carcass length	60
percent ham	60
loin eye area	50
percent lean cuts	35
five-month weight	25
number weaned	20
number farrowed	15
birth weight	5

TABLE 2 **SHEEP**

TRAIT	HERITABILITY (%)
face covering	50
staple length	45
yearling weight	40
weaning weight	30
multiple births	10

TABLE 3 **BEEF CATTLE**

TRAIT	HERITABILITY (%)
loin eye area	70
tenderness	60
carcass grade	40
birth weight	40
weaning weight	30
calving interval	10
cancer eye susceptibility	30

TABLE 4 **DAIRY CATTLE**

TRAIT	HERITABILITY (%)
size	50
birth weight	45
weight	35
fore udder and rear udder	35
dairy character	30
mastitis	25
milking quality	24
udder depth	22
udder size and shape	7

OBJECTIVE 7

Discuss sex determination and sex-linked traits.

Required Activities/Resources
- Transparency Master 7

Optional Activities/Resources
- Investigate sex-linked traits of cattle, swine, sheep, and poultry.

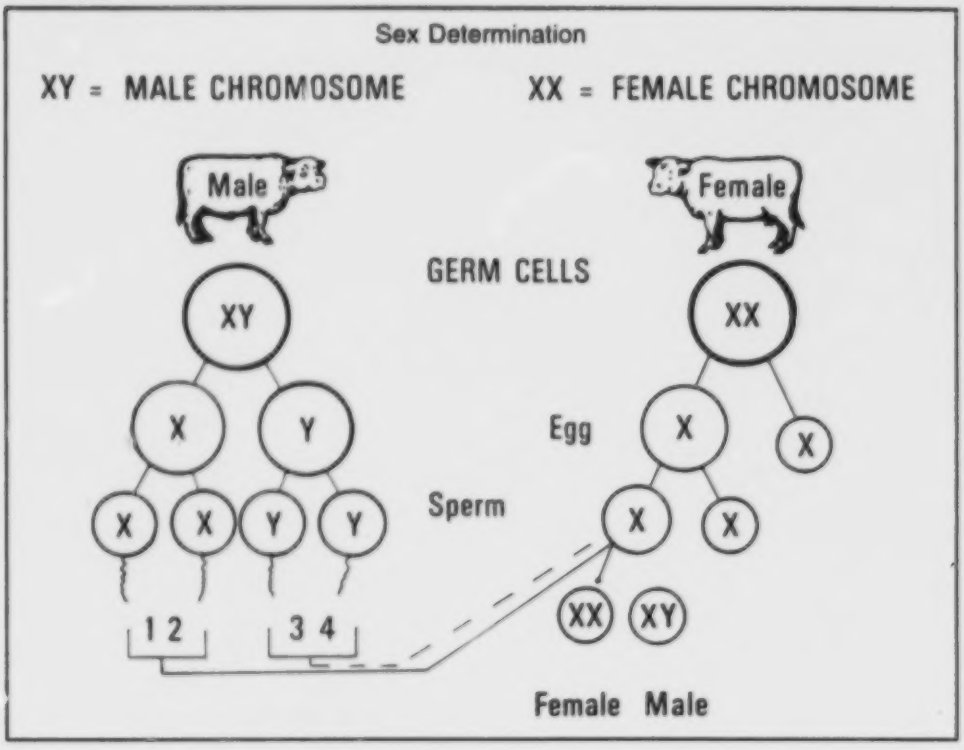
You will see a transparency on sex determination.

WORDS YOU SHOULD KNOW	
sex-linked genes	genes which are carried only on the sex chromosome

The sex of an animal is determined when the egg becomes fertilized – the makeup of a pair of chromosomes determines sex.

- **Mammals** (Figure 7)
  - The female has two identical sex chromosomes – XX.
  - The male has two different sex chromosomes – XY.
  - During meiosis, the chromosome pair divides. The egg will always have an X chromosome. The sperm will have either an X chromosome or a Y chromosome. When the egg and the sperm combine, the sex chromosome from the egg and the sperm become a pair. The sex of the progeny is determined by the pair of sex chromosomes.

FIGURE 7



- One half of the offspring will be males, and one half of the offspring will be females.

- **Poultry**
  - The male has two identical sex chromosomes – ZZ.
  - The female has two different sex chromosomes – ZW.
  - During meiosis, the chromosome pair divides. The sperm will always have a Z chromosome. The egg will have either a Z or a W chromosome. When the sperm and the egg combine, the sex chromosomes from the sperm and the egg become a pair. The sex of the progeny is determined by the pair of sex chromosomes.
  - One half of the offspring will be males, and one half of the offspring will be females.

- **Sex-linked traits** are hereditary characteristics propagated by genes located on the sex chromosomes. Some common sex-linked traits are:

- the thick neck of a bull
- hemophilia
- barred color in chickens

OBJECTIVE 8 **Complete Assignment Sheet 1.**

OBJECTIVE 9 **Complete Assignment Sheet 2.**

OBJECTIVE 10 **Complete Assignment Sheet 3.**

OBJECTIVE 11 **Match abnormal genetic conditions to their descriptions.**

Required Activities/ Resources
- Transparency Master 8
- Media presentation on abnormal genetic conditions

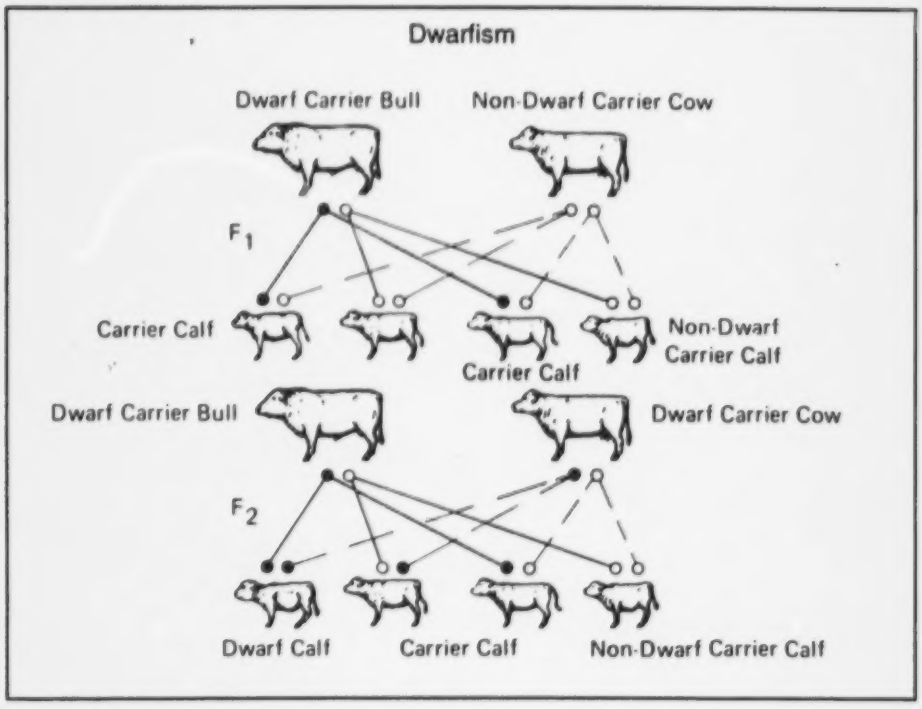
You will see a transparency on dwarfism.

Abnormal genetic conditions include:

- **agnathia (cattle)** – Agnathia is an inherited disease that results in a lower jaw that is several inches shorter than the upper jaw. Agnathia has only been observed in male calves, so it may be sex-linked.
- **bulldog (cattle)** – Bulldog is caused by a recessive gene that results in eye sockets that are large, nasal bones that are short and broad, and a forehead that is broader than normal.
- **cerebral hernia (cattle)** – Cerebral hernia is caused by a recessive gene. The calf is born with an opening in its skull, allowing brain tissue to protrude.
- **splay toe** – A recessive gene causes a ligament in the foot to deteriorate, making the toes spread outward.
- **dwarfism (cattle)** – Dwarfism is caused by a recessive gene. A dwarf calf is short-headed, short-legged, or pot-bellied. The pot-bellied variety is most common.

  Dwarfism is an example of an inherited characteristic caused by a recessive gene not located on sex chromosomes. (Figure 8)

FIGURE 8



- **epilepsy** – Epilepsy is caused by a dominant gene. Symptoms include the lowering of the head, chewing of the tongue, foaming at the mouth, and finally a collapse into a coma. Attacks occur at irregular intervals.

- **hairlessness** – Hairlessness is due to a recessive gene. The affected animal is hairless over all or part of its body.

- **hemophilia** – Hemophilia is caused by a recessive, male sex-linked gene. The affected animal's blood does not coagulate properly.

- **lethal genes** – Any of a number of genetic factors that cause death of the young, usually during prenatal development or at birth.

- **porcine stress syndrome (PSS)** – PSS is caused by a recessive gene and is triggered by stress in swine. PSS causes a failure of the blood circulation system.

- **spider syndrome** – Spider syndrome is caused by a recessive gene that results in bent forelimbs, "twisted" spine, and angled rump in black-faced sheep.

OBJECTIVE 12

List factors affecting fertility.

Optional Activities/Resources
- List specific conditions that would create each of these causes.

WORDS YOU SHOULD KNOW	
sterile	incapable of reproducing

Causes of sterility and delayed breeding:

- low quality semen
- physical defects and injuries
- psychological condition
- infection and disease
- poor management and feeding
- inherited abnormalities
- age
- high temperature
- cystic ovary disease caused by hormonal imbalance
- silent heat – The female shows no sign of estrus.
- Freemartin – A female calf may be sterile if born with a male twin. The sex organs of the female fetus may not develop due to male hormonal influences during pregnancy.

OBJECTIVE 13

Choose the word or phrase to complete statements about Expected Progeny Difference records (EPDs).

Required Activities/Resources
- Interpret a sample EPD with students.

Optional Activities/Resources
- Talk with a breed association member about EPDs and how they relate to the breed.
- Write to a breed association asking for EPD information and charts.

(?) Your instructor will discuss and interpret a sample EPD with you.

EPDs enable you to make educated selecting and breeding decisions.

- Proper bull selection is important because it
  - improves economically important traits
  - eliminates or reduces stock weaknesses
- Expected Progeny Difference (EPD):

  ☛ **NOTE:** EPD value can be computed for cows as well as for bulls. Given the impact of a single bull, EPD values for bulls are used more often when making breeding and selecting decisions.

  - provides an estimate for the breeding value of bulls by trait
  - enables you to make comparisons between bulls within one breed
- Stock managers use EPDs to select bulls. Different EPDs will be considered for different breeding situations.

  EXAMPLE: Generally a stock manager would **NOT** choose a bull with a high birth weight EPD for younger cows because a large calf may damage the reproductive organs of the cow. However, if the stock manager is selecting a bull for the terminal pregnancy (the last breeding for an older cow) then a large birth weight would be valuable; the risk to the cow would be irrelevant.
- **Cautions when using EPDs**
  - EPD values are only comparable within one breed because different breeds use different comparison values. EPD comparisons cannot be made across breeds.

    ☛ **NOTE:** Each breed association conducts its own analysis. Consult the individual breed association for its production-testing method.
  - EPDs cannot be used to predict absolute performance. They are used only for predicting *comparative difference* in performance.
  - The EPD represents the *average expected progeny.* Individual progeny will vary.
  - Bull selection will vary depending on the weaknesses and strengths of the herd. No one bull is right for all situations.

- **Primary EPD traits include:**
  - birth weight
  - weaning weight – weight at 205 days
  - yearling weight – weight at 365 days
  - milking ability – the ability of a sire's daughter to produce milk
  - maternal influence – a value that combines growth and milk information and a prediction of the weaning weight performance of calves from a sire's daughters
- **Additional EPD traits**
  - direct calving ease – the ease with which the females will sire a calf from the given bull (a subjective estimate)
  - maternal calving ease – the ease with which daughters of a sire calve as first-calf heifers (a subjective estimate)
  - gestation length – in days

    ☑ **NOTE:** See objective 25.
  - yearling height – in inches
  - scrotal circumference – in centimeters at puberty
  - carcass weight – in pounds
  - marbling – in USDA marbling degrees
  - ribeye area – in square inches
  - fat thickness – in inches
- **Calculation using EPD values**
  - Assume that one bull has an EPD for yearling weight of +35 and anther bull has an EPD for yearling weight of +15. The estimated difference in weight of their calves (using comparable females) at yearling age would be 20 pounds.

OBJECTIVE 14

Complete Assignment Sheet 4.

OBJECTIVE 15

Select from a list true statements about production testing.

Optional Activities/Resources
- Talk with a stock manager about the importance of production testing.
- Visit a facility that uses production testing.

WORDS YOU SHOULD KNOW	
percent calf crop	the number of calves weaned divided by the number of breeding females

- **production testing** – evaluating and selecting animals on the basis of progeny and performance testing; production testing focuses on traits that provide economic benefit for the stock

  ☑ **NOTE:** Accurate record keeping is essential for production testing to be useful.

- **progeny testing** – evaluating and selecting animals on the merit of their progeny; several progeny should be evaluated

- **performance testing** – evaluating and selecting animals on their individual merit or performance; comparison-based on several animals under similar conditions

- **Performance test records are used to:**

  - ☐ propagate genetically superior animals
  - ☐ cull low-producing animals
  - ☐ select replacement males and females
  - ☐ improve herd management
  - ☐ improve the grade of offspring produced
  - ☐ increase the weaning weight (mammals)
  - ☐ determine percent calf crop (for cattle; similar measures are used for other species)

    EXAMPLE: A stock manager breeds 50 ewes; 36 of the ewes produce lambs. The percent lamb crop calculation is done in two steps. **Step 1:** The number of lambs is divided by the number of ewes (36 ÷ 50 = .72). **Step 2:** The decimal or fraction is converted to a percent (.72 x 100% = 72%). So, the percent lamb crop is 72%.

  - ☐ provide buyers with information

- **Important traits for beef cattle:**
  - fertility
  - mothering and nursing ability
  - rate of gain
  - efficiency of feed utilization
  - longevity
  - carcass characteristics
- **Important traits for dairy cattle:**
  - milk production
  - stature
  - temperament
  - feedlot gain
- **Important traits for sheep:**
  - multiple births
  - rate of gain
  - fleece weight
  - skin folds
  - carcass characteristics
- **Important traits for swine:**
  - litter size
  - birth weight
  - daily rate of gain
  - days to 230 pounds
  - efficiency of feed utilization
  - carcass characteristics

OBJECTIVE 16

Complete Assignment Sheet 5.

OBJECTIVE 17

Discuss a specific advance in genetic engineering.

Optional Activities/Resources
- Substitute or add another genetic engineering event.
- Talk with a geneticist about genetic advances.
- Read an article on a recent topic in genetic engineering and present a short oral report.
- Video

WORDS YOU SHOULD KNOW	
bovine	referring to cattle
genetic engineering	the process of transferring genes from one individual to another individual or organism

☑ **NOTE:** Genetic engineering will have a dramatic impact on agriculture.

- Bovine Somatotropin (BST) is a bovine growth hormone. It is produced in small amounts by the pituitary gland. BST causes feed to be converted to milk production rather than to weight gain.
- Genetic engineers have identified and isolated the gene responsible for the production of BST in cows. They splice the gene into the DNA of cells of a certain type of bacteria. The bacteria then produces BST that is identical to the BST produced by a bovine pituitary gland.
- The bacteria carrying the BST gene is injected into dairy cows, causing an increased level of BST.
- Cows injected with BST bacteria show significant increases in milk production.

OBJECTIVE 18

Optional Activities/Resources
- Talk with stock managers who use different mating systems to compare and contrast the advantages and disadvantages of the different mating systems.
- Handout 1

Match mating systems to their descriptions, advantages, and disadvantages.

WORDS YOU SHOULD KNOW	
commercial animal	any animal that is not eligible for registry (nonpurebred)
cross breeding	mating animals of different breeds
hybrid vigor	improvement in the offspring resulting from favorable combinations of gene pairs
straight breeding	mating animals of the same breed

- **Straight breeding**
  - **variations of straight breeding**
    - **purebred breeding** – involves the mating of purebred animals of the same breed

      ☑ **NOTE:** Generally only experienced breeders practice purebred breeding. Purebred breeding is a highly specialized type of production.
    - **inbreeding** – involves the mating of closely related animals, increasing the genetic purity of the stock produced
    - **linebreeding** – involves mating animals which can be traced back to one common ancestor
    - **outcrossing** – involves the mating of animals of different families within the same breed
    - **commercial improvement** – involves the mating of purebred sires to commercial females
  - **advantages of straight breeding**
    - concentrates selected traits
    - develops uniformity

- **disadvantages of straight breeding**
  - may result in less desirable traits
  - loss of hybrid vigor
  - improvement is a slow process

- **Cross breeding**
  - **variations of cross breeding**
    - **two-way crosses** – mating a sire from one breed to a female from another breed
    - **three-way crosses** – mating crossbred females with a sire of a third breed
    - **crisscrossing** – mating crossbred females to a sire belonging to one of the parent breeds of the female
  - **advantages of cross breeding**
    - increased hybrid vigor
    - increased growth
    - higher fertility
    - increased disease resistance
  - **disadvantages of cross breeding**
    - reduced uniformity of offspring
    - offspring not eligible for registry

OBJECTIVE 19

Complete Assignment Sheet 6.

OBJECTIVE 20

Optional Activities/Resources
- Write an essay using these terms and their definitions to describe the reproductive process.

Define breeding periods.

Discuss the question, "Why is it important for a stock manager to recognize breeding periods?"

WORDS YOU SHOULD KNOW	
ovary	organ in the female reproductive system which produces eggs
viable egg	an egg that is capable of being fertilized under favorable conditions
viable sperm	a sperm that is capable of fertilizing an egg under favorable conditions
zygote	new cell resulting from the union of a sperm cell and egg cell

Breeding periods include:

- **puberty** – the age at which an animal produces viable eggs or sperm
- **estrous cycle** – the time when an egg is produced and capable of being fertilized
- **ovulation** – the release of the egg cell from the ovary
- **fertilization** – the union of a sperm cell with an egg cell, resulting in a zygote
- **gestation** – the time when an animal is pregnant
- **parturition** – the act of giving birth

OBJECTIVE 21

Optional Activities/Resources
- Visit a breeding facility and observe animals in heat and the use of various marking devices.

Choose the word or phrase to complete statements about estrus.

- **Signs of estrus (heat) for cattle and swine**
  - standing to be ridden
  - riding others
  - nervousness, restlessness

- swelling of the vulva
- frequent urination
- clear, sticky mucus flowing from vulva
- raising the tail head

- **Signs of estrus (heat) in ewes**
  - Ewes do not show visible signs of estrus.
  - A ewe is in heat if she accepts a ram.
  - Most ewes come into heat seasonally during the fall.

    ☛ **NOTE:** All white-faced ewes are capable of breeding twice a year, in spring and fall.

- **Estrus detection methods**
  - **observation** – Watch the animals for visible signs of heat.
  - **marking devices** – Marking devices are most commonly used for cattle and sheep. A dye, placed on the female's back, is rubbed off during breeding.
  - **teaser** – A teaser is an animal that responds to a female in heat. A teaser is placed in the presence of females and an observer watches to see whether or not the teaser mounts the female.

OBJECTIVE 22

Match farm animals to their normal estrous cycles.

Required Activities/Resources
- Transparency Masters 9, 10, and 11

Optional Activities/Resources
- Talk with a stock manager about the optimal time to breed stock.

You will see transparencies of the estrous cycles in cows and sows and the time of breeding and conception rate in cattle.

- Breeding success will be increased if breeding occurs during the proper time during estrus. (Table 5, Figures 9-11)

TABLE 5 **Farm Animals and Their Normal Estrous cycles**

Species	Average length of estrous cycle (days)	Average length of estrus	Time of ovulation	Best time to breed
Cattle (Figures 9 and 11)	21	16-18 hours	10-14 hours after the end of estrus	12-20 hours after the start of estrus
Swine (Figure 10)	21	3 days	mid-estrus	second half of estrus
Sheep	16	30 hours	late estrus	(see note)

☞ **NOTE:** Since ewes show no visible signs of estrus, it is difficult to regulate the time of breeding.

FIGURE 9

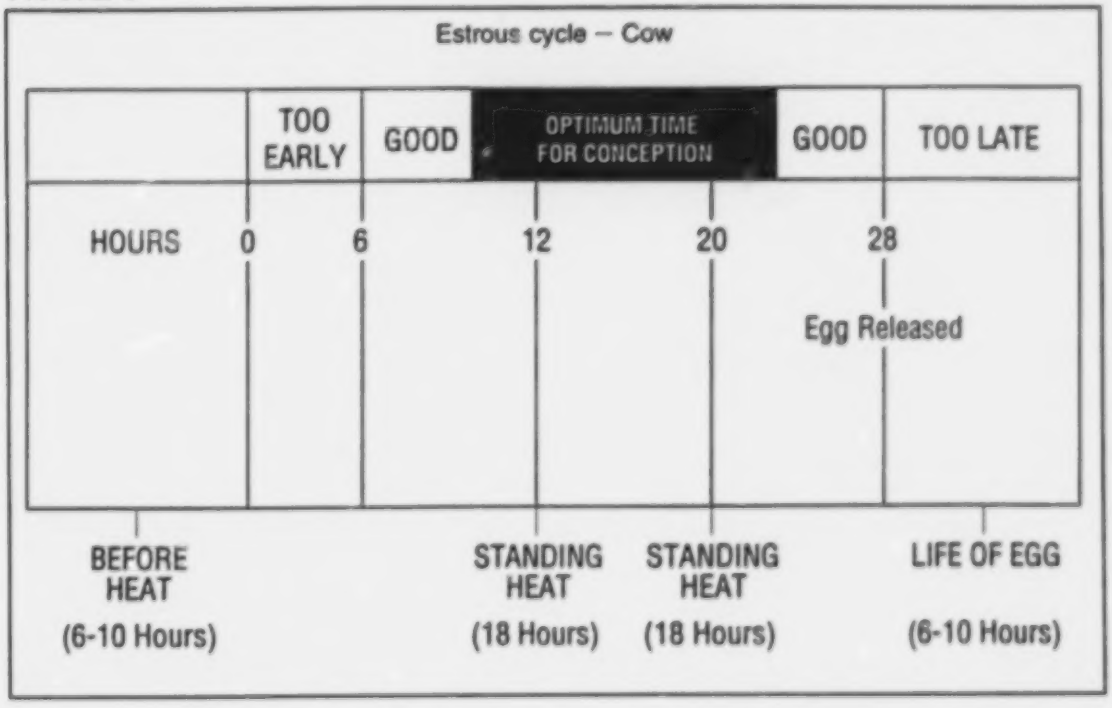


FIGURE 10

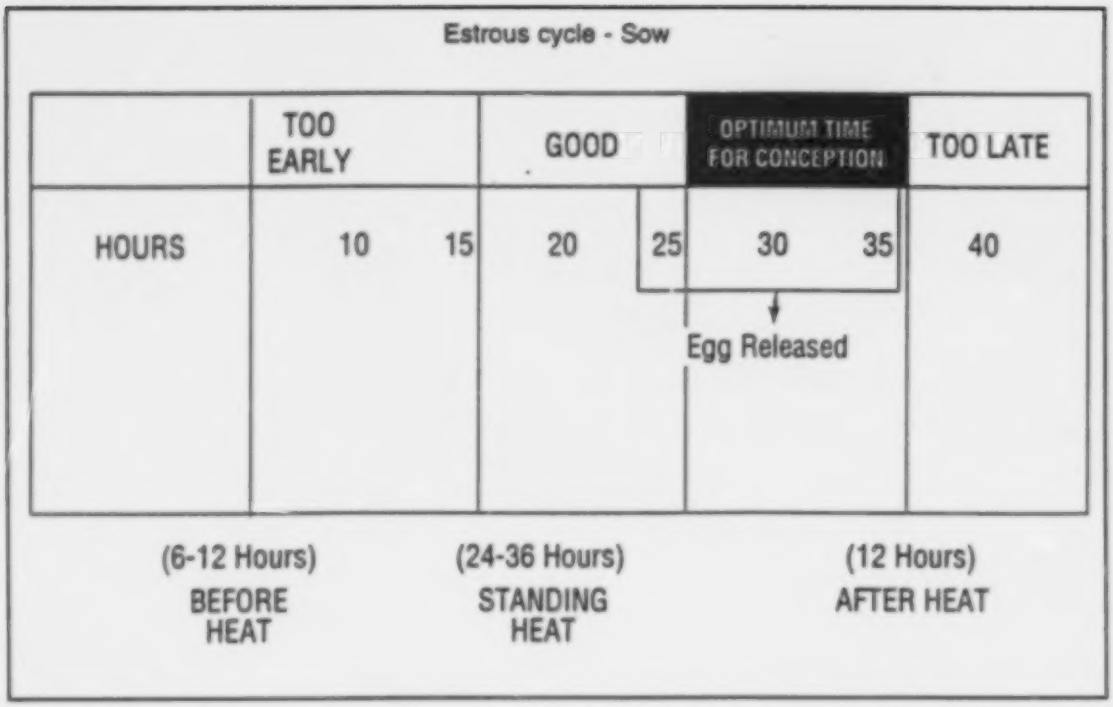
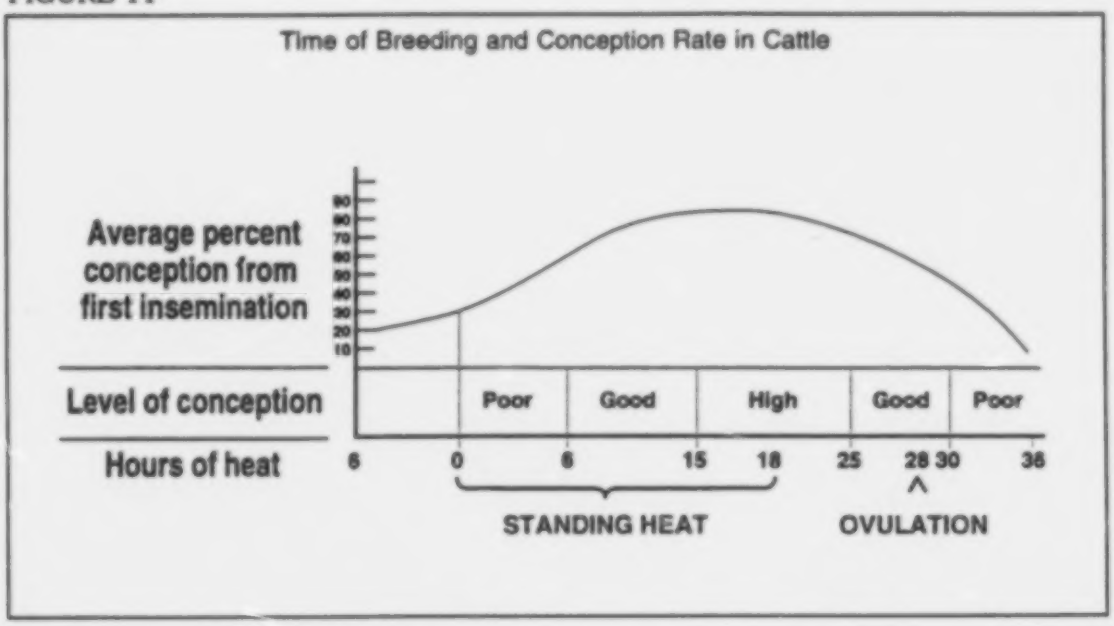


FIGURE 11



OBJECTIVE 23 | **Complete Assignment Sheet 7.**

OBJECTIVE 24 | **Complete Assignment Sheet 8.**

OBJECTIVE 25 | **Choose the word or phrase to complete statements about heat synchronization.**

Optional Activities/Resources
- Visit a breeding facility that practices heat synchronization.

- Synchronization of estrus (heat synchronization) involves using hormones or hormonelike substances to cause all of the females to come into heat within a short period of time. Progestagens and prostaglandins are the most common types of drugs used for heat synchronization.

  ☞ **NOTE:** Discuss the use of all medicines and chemicals with your veterinarian. They should be used only under the direct supervision of a veterinarian. Misuse of hormones or injecting hormones in an animal that is already pregnant can cause abortion or permanent damage to reproductive functions.

- **Advantages of heat synchronization**
  - reduced labor in detecting estrus in the herd
  - easier scheduling of artificial insemination
  - produces a more uniform calf crop
  - reduced breeding and calving seasons

- **Disadvantages of heat synchronization**

  ☞ **NOTE:** A heat synchronization program requires a high level of management. Consult a veterinarian if you want to use heat synchronization in your operation.
  - The cost of the hormone treatment per animal is relatively high.
  - The conception rate may be low.
  - The cows will all give birth during a relatively short period of time.
  - Adequate breeding and birthing facilities are necessary.

OBJECTIVE 26

Match livestock to their gestation periods.

Optional Activities/Resources
- Use flash cards to learn gestation periods for each species.

☞ **NOTE:** Learn these gestation periods by heart because you will have to use them repeatedly throughout Section B and in your work with livestock.

The average gestation periods for different species:

- cattle – 283 days
- swine – 114 days
- sheep – 148 days

OBJECTIVE 27

Discuss methods of selecting poultry.

Optional Activities/Resources
- Visit a poultry production facility.

☞ **NOTE:** Most poultry production operations get their birds from commercial hatcheries.

- **Methods of selecting poultry**
  - **physical appearance** – select birds according to physical characteristics
  - **pedigree** – select birds according to the performance of ancestors
  - **family** – select birds based on the performance and appearance of closely related family
- **Characteristics that lead to high egg production**
  - clean, smooth face
  - good-sized comb with good color
  - deep, broad, angular body form
  - broad, flat back
  - fully feathered with good quality plumage
  - shanks with good healthy color
  - well-balanced on feet and toes

- **Boiler characteristics that contribute to market value**
  - wide breast; broad, straight back; bulging thighs; and heavily meated legs
  - high percentage of meat on bone
  - light, cream-colored fat evenly distributed over the body
  - absence of common defects, bruises, and broken bones
- Poultry not meeting layer or broiler standards should be culled from the flock.

ASSIGNMENT SHEET 1	*SELECTING AND BREEDING LIVESTOCK*	**B-1**

Name _____ Score _____

OBJECTIVE 8

Draw a diagram showing the inheritance of horns in cattle for the F_1 and F_2 generations.

INSTRUCTIONS

Use Figures 4 and 5 in objective 6 and the information below to complete Parts 1 and 2.

Composition
- Construct graphics and symbols

Data Analysis and Display
- Apply principles of probability

Life Science
- Investigate/apply principles of genetics/heredity

Part 1:

Suppose you mated a pure polled bull having dominant genes (PP) to a horned cow having recessive genes (pp). What would be the offspring's gene combinations? Draw a diagram for the F_1 generation.

Part 2:

Suppose that a male offspring from the F_1 generation was mated with a cow having the genes (Pp). Draw a diagram for the F_2 generation.

ASSIGNMENT SHEET 2	*SELECTING AND BREEDING LIVESTOCK*	**B-1**

Name _____ Score _____

OBJECTIVE 9

Determine color inheritance of offspring.

INSTRUCTIONS

Answer the following questions about color inheritance.

Life Science
- Investigate/apply principles of genetics/heredity

Cognitive Activities
- Predict results/outcomes
- Transfer knowledge/training to new situations

1. In Angus cattle, black coloring (B) is dominant to red coloring (b). A black bull, genotype BB, is mated to a red cow.
   a. The offspring will have what coloring? _____
   b. What will be the genotype of the offspring? _____
2. An Angus bull, genotype Bb, is mated to a red cow.
   a. What are the possible genotypes of the offspring?

      _____
   b. What would be the coloring of the offspring? _____
3. A red Angus bull is mated to a black cow, genotype BB.
   a. What are the possible genotypes of the offspring?

      _____
   b. What would be the coloring of the offspring? _____
4. Black and white coat in Holsteins is dominant over red and white.
   a. If a black and white (BB) bull is mated to a black and white cow (Bb), what would be the color of the offspring?

      _____
   b. If a black and white bull (Bb) is mated to a red and white cow, what would be the color of the offspring?

      _____

c. If a red and white bull is mated to a red and white cow, what would be the color of the offspring?

_____

5. White color (W) in swine is dominant over non-white color (w).

   a. What would be the color of the offspring of a white male (Ww) bred with a white female (Ww)?

   _____

   b. What would be the color of the offspring of a white male (WW) bred with a white female (Ww)?

   _____

   c. What would be the color of the offspring of a non-white male bred with a non-white female?

   _____

6. White wooled sheep is dominant to black wooled sheep.

   a. What would be the color of the offspring, if a black wooled male is bred with a black wooled female?

   _____

   b. What would be the color of the offspring, if a white wooled male (WW) is bred with a black wooled female (ww)?

   _____

   c. What would be the color of the offspring, if a white wooled male (Ww) is bred with a black wooled female (ww)?

   _____

   d. What would be the color of the offspring, if a white wooled female (WW) is bred with a black wooled male (ww)?

   _____

7. You have a black wooled male (ww) and a white wooled female (WW).

   a. Can you produce black wooled offspring?

   _____

   b. How many generations would it take to produce black wooled offspring?

   _____

   _____

ASSIGNMENT SHEET 3	*SELECTING AND BREEDING LIVESTOCK*	**B-1**

Name _____ Score _____

OBJECTIVE 10

Estimate possible gene combinations using the Punnett Square method.

INSTRUCTIONS

Use the Punnett Square method to estimate the *possible* gene combinations. Write the required information in the squares.

REMEMBER: The combinations show the possible genotype of the offspring; NOT actual offspring characteristics.

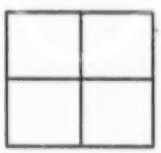
Composition
- Construct graphics and symbols

Data Analysis and Display
- Apply principles of probability
- Construct charts and tables

Life Science
- Investigate/apply principles of genetics/heredity

Cognitive Activities
- Predict results/outcomes
- Transfer knowledge/training to new situations

1. Suppose you mated a polled cow (PP) to a horned bull (pp).



a. What would be the offspring's gene combinations?

_____

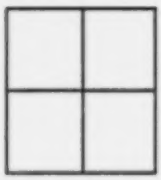
b. What would the genotype ratio be?

_____

c. What would the phenotype ratio be?

_____

2. Suppose you mated a polled cow with a recessive gene for horns (Pp) to a horned bull (pp).



a. What would be the offspring's gene combinations?

_____

b. What would the genotype ratio be?

_____

c. What would the phenotype ratio be?

_____

3. Suppose you mated a cross of a bull carrying tall genes (DD) to a cow carrying dwarf genes (dd).

What would be the F_1 gene combinations of the offspring?

_____

1:10

4. Suppose a bull from the cross in the preceding question [a bull carrying tall genes (DD) and a cow carrying dwarf genes (dd)], also carrying genes for tall with a recessive gene for dwarf, is mated with a female with the same gene combination.

a. What would be the F_2 gene combinations of the offspring?

_____

b. How many offspring would be pure for tall?

_____

c. How many offspring would be tall with a recessive gene for dwarf?

_____

d. How many offspring would be dwarf?

_____

5. Rose comb (R) in chickens is dominant to single comb (r).

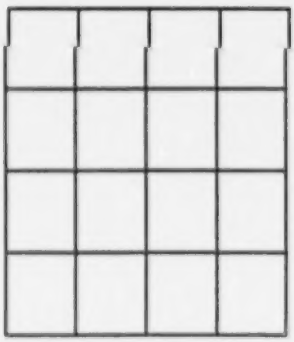
a. Using a Punnett square, explain how it is possible for a rose comb male and a rose comb female to produce a single comb offspring in a single generation.

b. What is the genotype of the mating male and female?

male _____

female _____

6. Suppose a polled, black cow (PpBb) is crossed with a polled, black bull (PpBb).



a. How many phenotype possibilities are there?

_____

b. List the phenotypes and the number of offspring with the phenotype.

_____

_____

_____

_____

7. Suppose a polled red bull (PPRR) is crossed with a horned white cow (pprr).

a. What is the genetic make-up of the gametes of each parent?

male _____

female _____

b. What would be the gene combination of the F_1 offspring?

_____

8. Two of the F_1 offspring from the preceding question are mated. [a polled red bull (PPRR) is crossed with a horned white cow (pprr)].

a. List the genotype combinations and the number of times the combination occurs on the square.

_____

_____

_____

_____

_____

_____

b. List the phenotypes and the number of times the combination occurs on the square.

_____

_____

_____

_____

9. In cattle, black (B) is dominant to red (b) and polled (P) is dominant to horned (p).

   a. Using a Punnett square, show how it is possible for a black polled bull and a black polled cow to produce a red horned offspring.

   b. What is the genotype of the mating male and female?

      male _____

      female _____

ASSIGNMENT SHEET 4	*SELECTING AND BREEDING LIVESTOCK*	**B-1**

Name _____ Score _____

OBJECTIVE 14

Analyze Expected Progeny Difference (EPD) records and performance records.

EQUIPMENT AND SUPPLIES

- Salers EPD table
- Explanation of Listings
- Distribution of Sire EPD table

INSTRUCTIONS

Use the EPD table, the Distribution of Sire EPD table, and the explanation of listings to answer the following questions.

Reading Comprehension
- Gain factual information
- Draw conclusions

Functional Reading
- Interpret graphics and symbols

1. Locate MR ROYAL on the EPD table.

   a. Who owns MR ROYAL? _____

   b. Where was MR ROYAL bred? _____

   c. What is MR ROYAL's maternal milk EPD? _____

Operation and Calculation
- Calculate with decimals

Data Analysis and Display
- Interpret charts and tables

2. Locate MR. BLUE GRASS on the EPD table.

   a. Is MR. BLUE GRASS horned or polled? _____

   b. What is MR. BLUE GRASS' birth weight EPD? _____

   c. How does MR. BLUE GRASS' yearling weight EPD compare to the average?

   _____

Life Science
- Investigate/apply principles of genetics/heredity

3. Describe, in simple terms, what the yearling weight EPD means.

   _____

   _____

Cognitive Activities
- Predict results/outcomes
- Transfer knowledge/training to new situations

4. Locate MR ERC 224S and MR NOY 11S on the EPD table.

   a. What are the respective birth weight EPDs?

      MR ERC 224S _____

      MR NOY 11S _____

   b. What is the expected difference in the birth weight of the offspring?

      _____

   c. Which sire would produce the heavier offspring?

      _____

   d. Can we be certain that the difference will be 5.3 pounds? Explain your answer.

      _____

      _____

5. Locate MR CHAIRMAN A30L and MR RAWHIDE DEAN on the EPD table.

   a. What is the expected difference in the birth weight of the offspring? Why?

      _____

      _____

      _____

   b. What is the expected difference in the weaning weight of the offspring?

      _____

      Which sire is expected to produce the heavier weaning weight offspring?

      _____

   c. Is the weaning weight EPD of MR RAWHIDE DEAN above or below the average?

      _____

6. Locate MR NOY 9S POLLED PACHA and MR DJL T121S on the EPD table.

   a. What are the respective yearling weight EPDs?

      MR NOY 9S POLLED PACHA _____

      MR DJL T121S _____

   b. What is the expected difference in the yearling weight of the offspring?

      _____

   c. Which sire would produce daughters with above average milking ability?

      _____

      Explain your answer.

      _____

      _____

7. Using birth weight, explain why a large EPD is not always better.

   _____

   _____

   _____

ASSIGNMENT SHEET 5	SELECTING AND BREEDING LIVESTOCK	B-1

Name _____ Score _____

OBJECTIVE 16

Calculate percentage calf/lamb crop.

EQUIPMENT AND SUPPLIES

- Calculator, if needed

INSTRUCTIONS

Operation and Calculation
- Calculate with whole numbers

Math Application
- Solve percent problems

The effectiveness of a breeding program can be displayed by the calf crop and the lamb crop percentages. You calculate the calf or lamb crop percentages by comparing the number of successful births to the number of females bred.

EXAMPLE:

Julie breeds 40 cows during the breeding season. The 40 cows produce 32 calves. Determine the calf crop percentage.

32 (the number of calves) ÷ 40 (number of cows bred) = .8

.8 x 100 = 80% The percent calf crop is 80%.

Answer the following questions using the calf or lamb crop percentage calculation.

1. Peter delivers 27 lambs at the end of the birthing season. Peter looks at his records and sees that he originally bred 30 ewes. What is the lamb crop percentage?

   _____

2. Marilyn breeds 36 cows that give birth to 27 calves. What is the calf-crop percentage?

   _____

3. Sandy bred 120 ewes that gave birth to 100 lambs. What is the lamb crop percentage?

   _____

4. John meets Mary at the feed store. They are both relieved that the birthing season is finally over. John has 42 new calves and Mary has 15 new calves. John jokes that he's a better breeder than Mary. Mary argues that, in fact, she was more successful because she bred only 18 cows, while John bred 52 cows.

   a. What is the percentage calf crop for John's herd?

   _____

   b. What is the percentage calf crop for Mary's herd?

   _____

   c. Who was the better breeder?

   _____

5. Antonio records in his farm records that in 1994, 35 cows produced 23 calves. He checks his records from 1993 when he bred 25 cows and had 19 calves.

   a. What was his calf-crop percentage in 1993?

   _____

   b. What was his calf-crop percentage in 1994?

   _____

   c. Which year was more successful?

   _____

ASSIGNMENT SHEET 6	*SELECTING AND BREEDING LIVESTOCK*	**B-1**

Name _____ Score _____

OBJECTIVE 19

Select mating methods.

INTRODUCTION

Language
- Use standard grammar, spelling, and capitalization
- State ideas clearly

Composition
- Use complete sentences
- Compose essays
- Construct graphics and symbols

Life Science
- Investigate/apply principles of genetics/heredity

You will select a mating method from the list provided. In Part 1, you will write a short essay (one or two paragraphs) on the advantages and disadvantages of the mating method that you select. In Part 2, you will make a diagram (for at least two generations) that explains your selected mating method. Your teacher will collect and display your completed diagram.

Mating method choices:

- purebred breeding
- inbreeding
- line breeding
- outcrossing
- commercial improvement
- two-way crosses
- three-way crosses
- crisscrossing

INSTRUCTIONS

Part 1:

Write a short essay (one or two paragraphs) on the advantages and disadvantages of the mating method that you selected.

_____

_____

1: 20

Part 2:

Construct a diagram (for at least two generations) that demonstrates your selected mating method.

ASSIGNMENT SHEET 7

SELECTING AND BREEDING LIVESTOCK

B-1

Name _____ Score _____

OBJECTIVE 23

Identify points in time on an estrous cycle chart.

INSTRUCTIONS

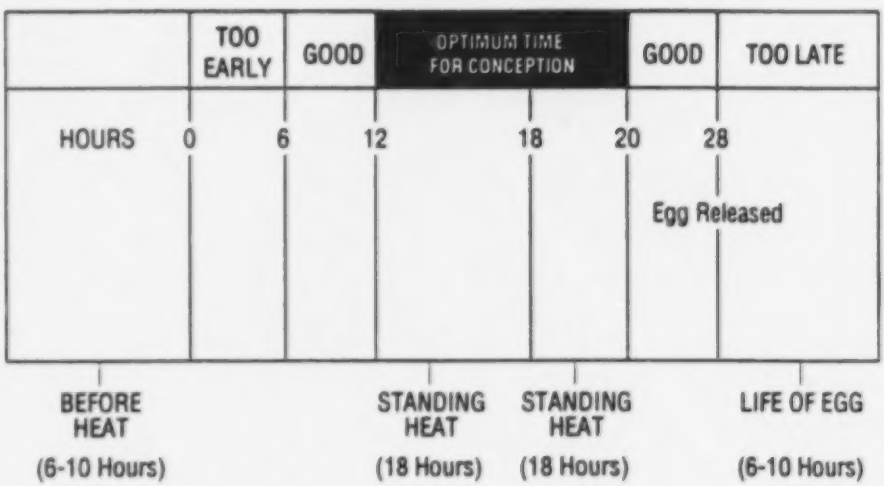
Using the chart below, identify points in time in the cow's estrous cycle.

Operation and Calculation
- Calculate with whole numbers

Data Analysis and Display
- Interpret charts and tables

Life Science
- Investigate/apply principles of anatomy/physiology

Estrous Cycle - Cow



1. When is the best time to breed? _____
2. When is the egg released from the ovary? _____
3. Is it better to breed before or after the egg is released?

   _____

4. a. When is it too late to breed? _____

   b. Why? _____

5. After the start of estrus, when will a cow stand to be ridden?

   _____

6. You recognize the first signs of heat at 5:00 a.m. on May 4th.

   a. When is the best time to breed the cow? _____

   b. What time is the egg released? _____

7. You return from a two day auction at 1:00 p.m. Your hired hand runs up to the truck and tells you that he had seen the first signs of estrus in Rose, your best breeder, yesterday at 6:00 p.m. About how many hours do you have to breed her?

   _____

8. Your neighbor Jack is in a rush to get on vacation. Emily, a valuable cow, started to show signs of heat at 9:00 a.m. Jack finishes breeding Emily by 10:30 a.m. He is worried that Emily was not successfully bred. Why?

   _____

   _____

ASSIGNMENT SHEET 8	*SELECTING AND BREEDING LIVESTOCK*	**B-1**

Name _____ Score _____

OBJECTIVE 24

Determine the proper times for breeding.

INSTRUCTIONS

In Part 1, you will determine the proper times for breeding. In Part 2, you will construct a table to display information on the estrous cycle, time of ovulation, and proper times for breeding.

Composition
- Construct graphics and symbols

Part 1: Answer the questions using the information provided.

General breeding information:

Sperm remains viable about 24 to 30 hours after breeding. If an animal is bred too early, the semen will not survive. If the animal is bred too late, the egg will have passed by the uterus.

Data Analysis and Display
- Construct charts and tables

Specific breeding information:

- **Cows:**

  Average length of estrus: 16-18 hours
  Time of ovulation: 28 hours from the beginning of estrus

- **Sows:**

  Average length of estrus: 40-60 hours
  Time of ovulation: 23-36 hours after the start of estrus

- **Ewes:**

  Average length of estrus: 30 hours
  Time of ovulation: near the end of estrus

Life Science
- Investigate/apply principles of anatomy/physiology

1. How many hours after the start of estrus should a cow be bred? _____

   Hint: The highest conception rate occurs when a cow is bred ten hours before ovulation.

2. How many hours after the start of estr[illegible]ould a sow be bred? _____

   Hint: The highest conception rate occurs when a sow is bred during ovulation.

3. How many hours after the start of estrus should a ewe be bred? _____

   ☛ **NOTE:** It is very difficult to determine the start of estrus in ewes. Accordingly, it is very difficult to determine the best time to breed.

Part 2: Construct a table that displays the time that estrus starts, the time that estrus ends, and the best time to breed for the following animals.

Cathy the cow starts estrus on June 3rd at 8:00 a.m.

Sally the sow starts estrus on July 4th at 4:00 p.m.

Emily the ewe starts estrus on September 10th at 6:a.m.

OBJECTIVE SHEET

REPRODUCTIVE ORGANS

B-2

INTRODUCTION

Breeding is one of the most important aspects of raising a herd. Careful breeding insures that the continuation, health, and quality of the herd will continue. However, before any breeding program can be devised, a thorough knowledge of the reproductive systems and cycles must be attained.

PREREQUISITE

Unit B-1, "Selecting and Breeding Livestock"

FOCUS ASSIGNMENTS

Reading Comprehension
- Gain factual information
- Analyze cause and effect
- Draw conclusions

Language
- Use standard grammar, spelling, and capitalization
- State ideas clearly

Composition
- Use complete sentences

FOCUS ASSIGNMENTS	
PREREADING:	"Determining the Sex of Chicks" on page two of *Ostrich Production*, OSU Extension Facts No. 3988, by Joe Berry, Extension Poultry Specialist.
WRITING:	Write a short essay (one paragraph to one page) on how the information in the factsheet compares to your experiences and knowledge of raising livestock.

UNIT OBJECTIVE

After completing this unit, you will show the following competencies by mastering the activities on the Assignment Sheet by scoring at least 85% on the Written Test.

SPECIFIC OBJECTIVES

1. Choose the word or phrase to complete statements about reproduction.
2. Label components of the male reproductive tract.

3. Match male reproductive organs to their functions.

4. Label components of the reproductive tracts of a cow and a sow.

5. Match female reproductive organs to their functions.

6. Choose the word or phrase to complete statements about poultry reproductive systems.

7. Compare the reproductive systems of various animals. (Assignment Sheet)

8. Match hormones to their functions.

INFORMATION SHEET

REPRODUCTIVE ORGANS B-2

OBJECTIVE 1

Optional Activities/Resources
- Review estrus information from Unit B-1.
- Video
- Additional activities/resources in Instructor's Guide

Choose the word or phrase to complete statements about reproduction.

Discuss what you already know about reproduction and raising livestock.

WORDS YOU SHOULD KNOW	
corpus luteum	tissue that develops on the ovary when an egg has been expelled from the ovary; if conception occurs, the tissue produces progesterone; if conception does not occur, it disappears
estrus	the period in which the female is receptive to mating
estrous cycle	the period of time in which an egg is produced and can be fertilized
ovulation	the process in which the the egg, or ovum, is released from the follicle (the organ where it is formed)

- Reproduction is the method in which organisms produce offspring.
- **Methods of reproduction**
  - **sexual**
    - requires the union of male and female
    - method of all farm animal reproduction
  - **asexual**
    - does not require the union of male and female

      EXAMPLE: cell division

- **estrous cycle** – The cycle varies in length among species and among individuals within a species. It consists of four stages (Table 1):

  1. the animal stands for breeding (estrus)
  2. formation of the corpus luteum (metestrus)
  3. the corpus luteum releases hormones that stimulate the uterus to prepare for pregnancy (diestrus)
  4. the follicles grow rapidly to prepare for the next ovulation (proestrus)

- Ovulation occurs during the second stage in cattle, and during estrus for other species.

TABLE 1 **Estrous cycles by Species**

	Cow	Ewe	Sow
average length of estrus	21 days	17 days	20 days
estrus	16-20 hours	24-36 hours	48-72 hours
ovulation	10-12 hours after estrus	late estrus	mid-estrus

- Fertilization is possible only during estrus. The optimum time for conception is near the time of ovulation.

  ☞ **NOTE:** Review information on estrus from B-1, "Selecting and Breeding Livestock."

- Anestrus is the time when the estrous cycle doesn't occur, such as during pregnancy and immediately after birth; and in sheep during those seasons when they don't breed.

OBJECTIVE 2

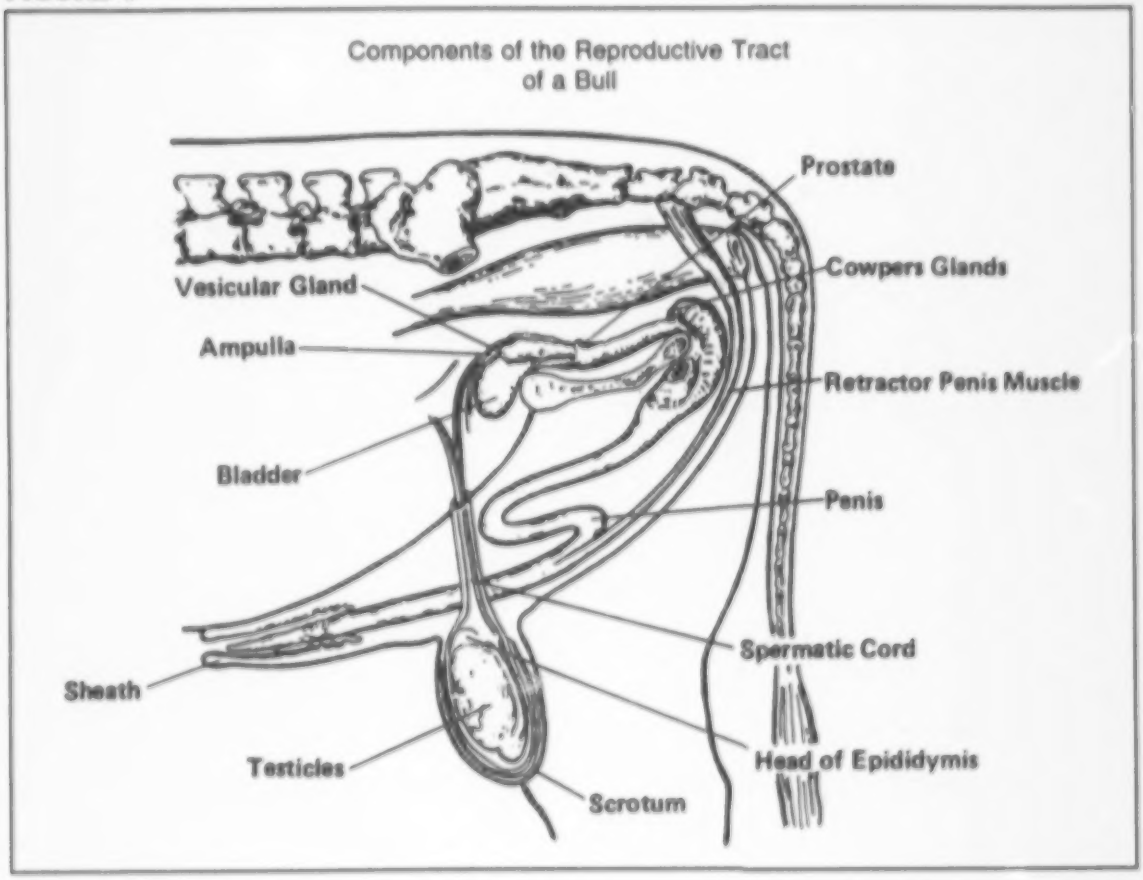
Required Activities/ Resources
- Transparency Master 1
- Study objectives 2 and 3 together

Label components of the male reproductive tract. (Figure 1)

You will see a transparency showing components of the male reproductive tract.

NOTE: Figure 1 is the reproductive tract of a bull. The components and their functions are essentially the same for rams and boars.

FIGURE 1



OBJECTIVE 3

Match male reproductive organs to their functions.

Optional
Activities/Resources
— View Transparency Master 1

WORDS YOU SHOULD KNOW	
copulation	the act of mating; intercourse
cryptorchid male	a male animal that is sterile because one or both testicles did not descend into the scrotum
ejaculation	movement of sperm from the epididymis through the penis
fructose	a sweet sugar produced by the body and used as a nutrient distributed by the bloodstream
gonad	the primary sex gland; ovaries in females and testes in males
spermatozoa	the male fertilizing cell; sperm

- **ampulla** – the structure that produces fructose
- **Cowpers gland** – the gland that secretes an alkaline material that cleans the urethra prior to ejaculation and produces a lubricating substance
- **epididymis** – the tube in which sperm is collected, matured, concentrated, and stored
- **penis** – the organ that transports sperm from the male to the female
- **prostate gland** – the gland that secretes a mineral composition that becomes part of the semen
- **retractor penis muscle** – the muscle that extends and retracts the penis during copulation
- **scrotum** – the external sac that houses the testes and maintains the proper temperature for sperm production and storage

- **seminal vesicle** – secretes a substance high in fructose which serves as a nutrient for spermatozoa transport
- **sheath** – the fold of skin that provides an opening to the male reproductive tract
- **spermatic cord** – supports the testes
- **testes** – the male gonad; produces spermatozoa
- **urethra** – the tube that transports urine and sperm
- **vas deferens** – the tubes that transport spermatozoa and serve as the storage place for spermatozoa until ejaculation

OBJECTIVE 4

Label components of the female reproductive tract.

Required Activities/ Resources
- Transparency Masters 2 and 3
- Study objectives 4 and 5 together

You will see transparencies showing the reproductive tract of a cow and of a sow.

NOTE: The reproductive tract of a ewe is essentially the same as that of a cow.

FIGURE 2

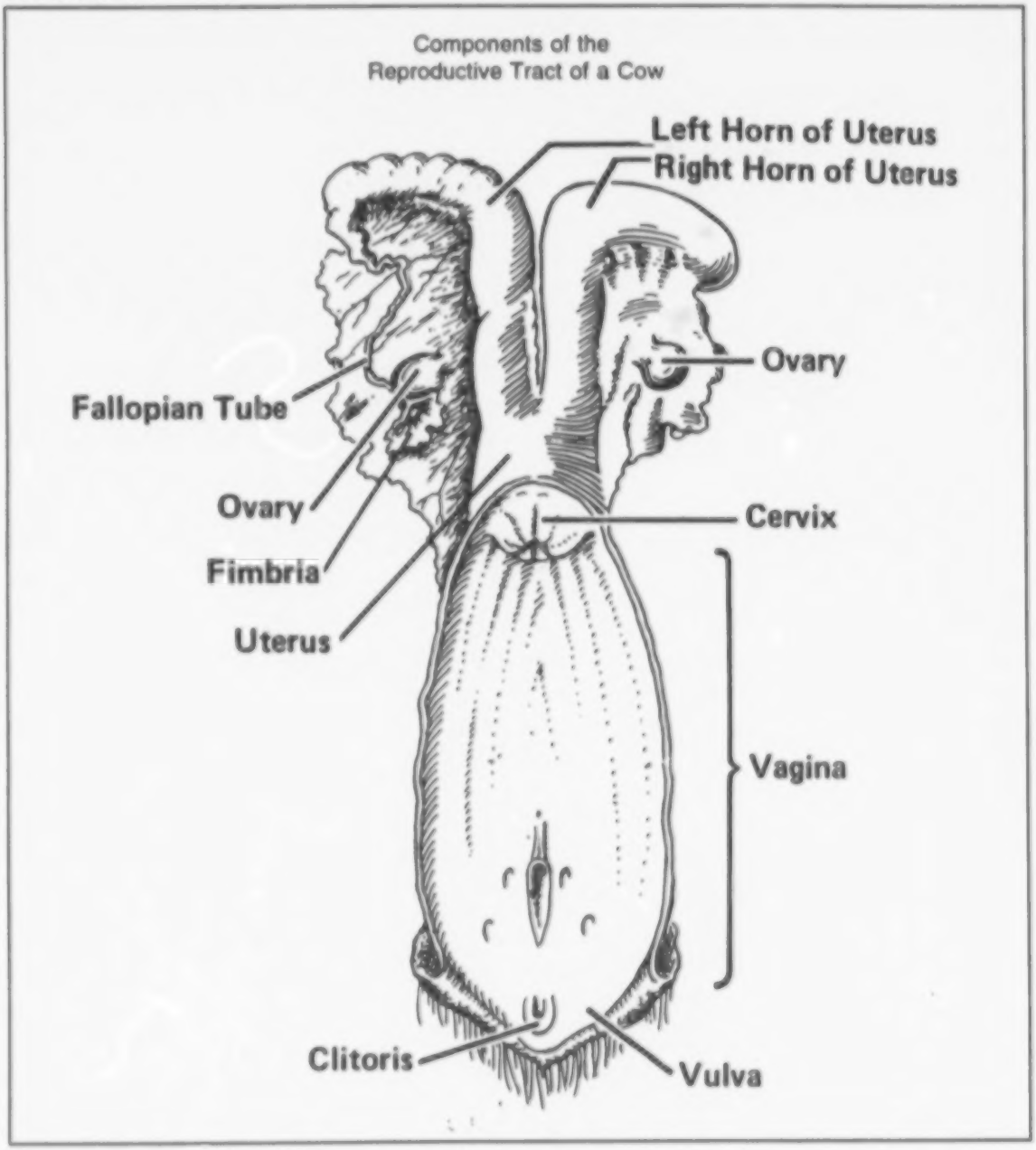
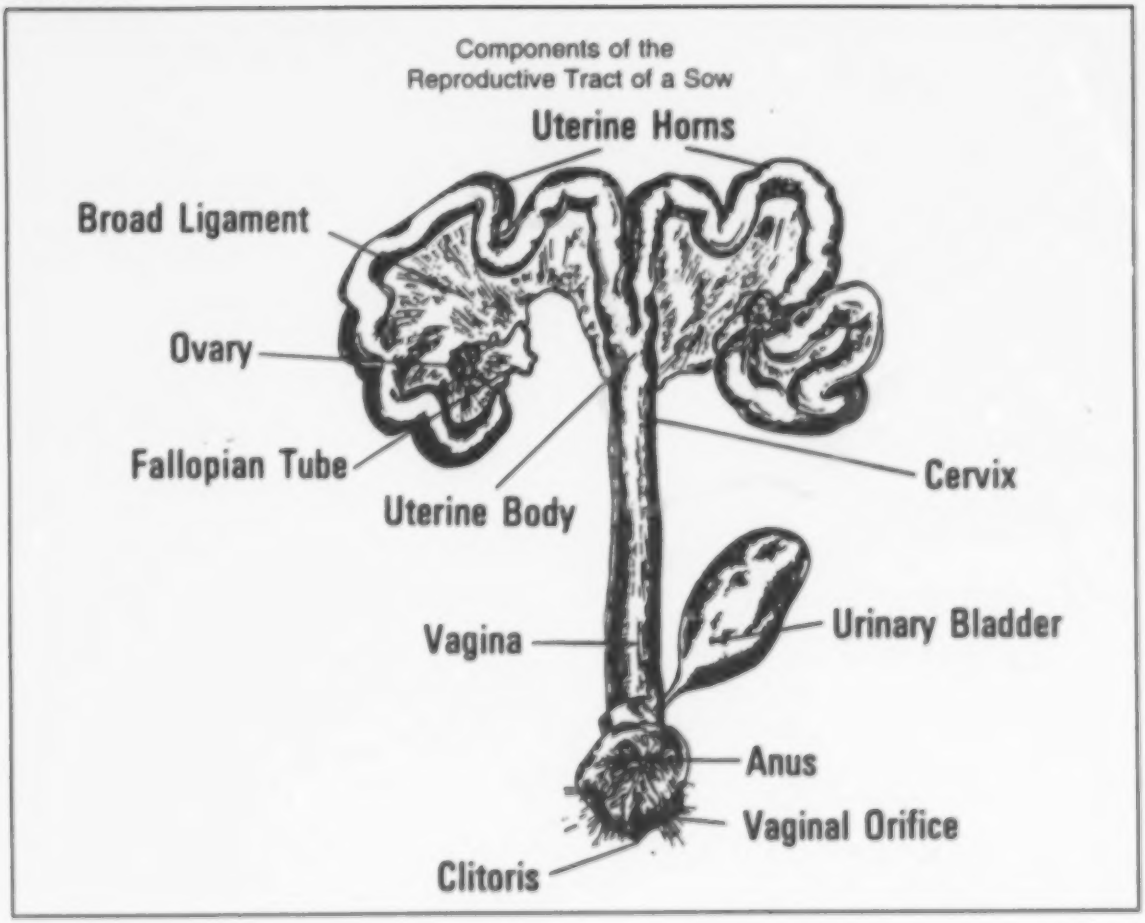


FIGURE 3


Components of the
Reproductive Tract of a Sow
Uterine Horns
Broad Ligament
Ovary
Fallopian Tube
Uterine Body
Cervix
Vagina
Urinary Bladder
Anus
Vaginal Orifice
Clitoris

OBJECTIVE 5

Optional Activities/ Resources
— View Transparency Masters 2 and 3

Match female reproductive organs to their functions.

WORDS YOU SHOULD KNOW	
embryo	the second stage of development within the uterus
fetus	the third stage of development within the uterus
zygote	the first stage of development within the uterus

- **cervix** – the tissue that forms a gateway between the vagina and uterus

  ☑ **NOTE:** During pregnancy, the cervix secrets a mucus that forms a "plug," closing the uterus.

- **clitoris** – the organ that increases the female's sexual excitement during copulation

- **fallopian tube** – the passage between the ovary and uterus; the site of fertilization

- **fimbria** – the opening to the fallopian tube which catches the egg as it is expelled from the ovary

- **horns of uterus** – the portion of the uterus in which the embryo develops into a fetus

- **ovary** – the female gonad; produces eggs

- **uterus** – the place of fetal implantation and development; the womb

- **vagina** – the channel receiving the male penis during copulation; the birth canal

- **vulva** – the outer opening of the female reproductive tract

OBJECTIVE 6

Required Activities/Resources
— Transparency Masters 4 and 5

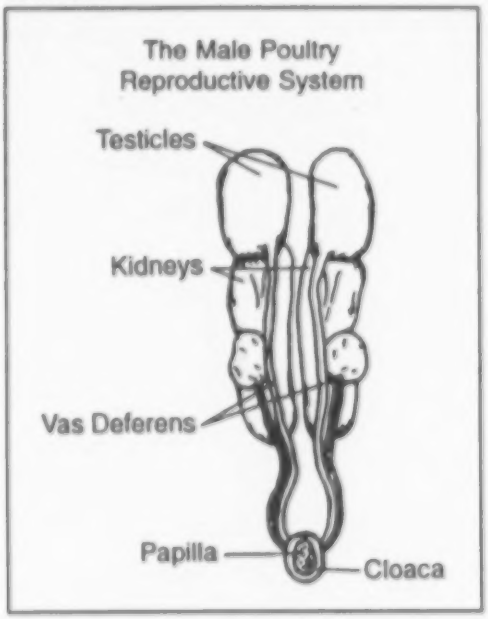
Choose the word or phrase to complete statements about poultry reproductive systems.

You will see transparencies showing the reproductive systems of male and female poultry.

Male Reproductive System

WORDS YOU SHOULD KNOW	
alimentary canal	the series of organs which transport and digest food, beginning with the mouth and ending with the anus or vent
cloaca	the site at which the large intestine joins the alimentary canal
papilla	the structure in the cloaca wall that deposits sperm into the female reproductive tract

FIGURE 4

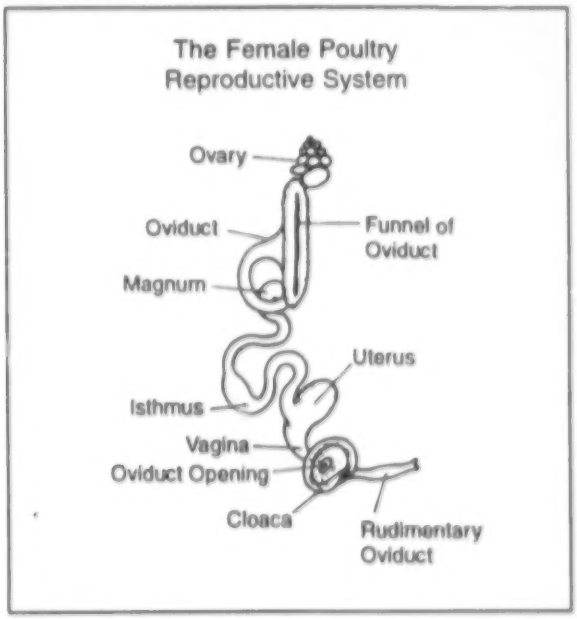


- Sperm and seminal fluid are produced in the testicles.
- The sperm is transported by the vas deferens to the cloaca, then to the papilla.
- The sperm is transported to the female via the papilla.

Female Reproductive System

WORDS YOU SHOULD KNOW	
funnel	the portion of the female tract that stores sperm received from the male and receives the yolk from the ovary
magnum	the portion of the female tract that secretes the egg white and deposits it around the yolk
isthmus	the portion of the female tract that deposits the shell around the egg yolk and white

FIGURE 5



- The female has two ovaries and two fallopian tubes, but only the left ovary and fallopian tube function.
- The female receives sperm cells from the male and stores them in the funnel.
- The funnel receives the yolk from the ovary.
- Fertilization occurs in the funnel.

- The fertilized yolk is transported to the magnum, where the white is secreted and deposited around the yolk. This process takes approximately three hours.
- The yolk and white are transported to the isthmus, where two shell membranes are deposited around the white. This process takes approximately one hour and fifteen minutes.
- The egg is transported to the uterus, where it remains for approximately twenty hours.
- The completed egg is transported to the vagina. After resting there for a short time, the egg is laid.
- The total egg production process takes approximately 25 to 27 hours.

OBJECTIVE 7

Evaluated on the Assignment Sheet.

OBJECTIVE 8

Match hormones to their functions.

Optional Activities/ Resources
— Research hormones used in livestock production

WORDS YOU SHOULD KNOW	
mammary glands	the female organs that produce milk
secondary sex characteristics	the differences between males and females that are not directly related to reproduction such as size, mammary glands, and horns

- **estrogens** – the set of female hormones that trigger estrus behavior, control the female reproductive cycle, and control the development of mammary glands and secondary sex characteristics
- **FSH (follicle stimulating hormone)** – stimulates estrogen production and follicle growth in females; stimulates sperm production in males
- **inhibin** – inhibits the production of FSH

- **LH (luteinizing hormone)** – stimulates follicle maturation, release of ovum, and production of corpus luteum in females; stimulates testosterone production in males

  ☞ **NOTE:** See objective 1 for the definition of corpus luteum.

- **oxytocin** – stimulates muscle contractions in the female reproductive tract; stimulates milk production

  ☞ **NOTE:** The muscle contractions caused by oxytocin production help move the ovum and sperm through the reproductive tract during fertilization and help force the fetus from the uterus during birth.

- **progesterone** – the female hormone that takes the animal out of heat when ovulation is completed, stimulates mammary gland development, and maintains pregnancy

- **prolactin** – stimulates mammary gland development and milk production

- **relaxin** – stimulates softening of the uterus for fetal development and softening of the cervix at birth

- **testosterone** – the male sex hormone responsible for male temper, odor, appearance, sperm production, and maintenance of the male reproductive system

ASSIGNMENT SHEET

REPRODUCTIVE ORGANS

B-2

Name _____ Score _____

OBJECTIVE 7

Compare the reproductive systems of various animals.

Required Activities/ Resources
— Introduce other sources of information

INSTRUCTIONS

Reading Comprehension
- Gain factual information
- Make generalizations

Research and Reference
- Select useful resources
- Locate resources
- Find materials in library
- Use standard references
- Use in-book reference tools

Language
- Use standard grammar, spelling, and capitalization
- State ideas clearly

Composition
- Compose reports

Cognitive Activities
- Collect/record information
- Draw conclusions

1. Select three farm animals. They can be traditional livestock, exotic livestock, or both.

2. Using information in this unit, as well as information in references and textbooks in your classroom and school library, compare the reproductive tracts of the three. Your report should include the following:

   - Reproductive system similarities among the animals
   - Reproductive system differences among the animals

OBJECTIVE SHEET	*ARTIFICIAL INSEMINATION*	**B-3**

INTRODUCTION

Artificial insemination, or AI, is about livestock improvement. AI makes it possible to use semen from a superior male to fertilize a number of females. If the proper semen is chosen, the quality of the livestock will improve. Dairy farmers have used AI extensively and have reaped the rewards with increases in productivity. AI will be used more and more when records of superior males become easily available and when livestock managers realize the gains that can be made. Simply put, livestock improvement means money; therefore, artificial insemination means money.

PREREQUISITE

None

FOCUS ASSIGNMENTS

Reading Comprehension
- Gain factual information
- Analyze cause and effect
- Draw conclusions

Language
- Use standard grammar, spelling, and capitalization
- State ideas clearly

Composition
- Use complete sentences

FOCUS ASSIGNMENTS	
PREREADING:	Read *Heat Detection Aids for Dairy and Beef A.I.*, by Glenn Selk, OSU Extension Facts No. 4154.
WRITING:	Write a short essay (one paragraph to one page) about the importance of accurate heat detection.

UNIT OBJECTIVE

After completing this unit, you will show the following competencies by mastering the activities on the Assignment Sheet, the Job Sheet, and by scoring at least 85% on the Written Test.

SPECIFIC OBJECTIVES

1. Choose the word or phrase to complete statements about artificial insemination (AI).
2. Describe how AI equipment is used.
3. List factors that contribute to poor conception rates.
4. Choose the word or phrase to complete statements about semen.
5. Choose the word or phrase to complete statements about semen cells.
6. Choose the word or phrase to complete statements about standards and sources.
7. Match methods of thawing semen in straws and ampules to their descriptions.
8. Examine semen for viability and abnormalities. (Assignment Sheet)
9. Discuss the importance of the estrous cycle in AI.
10. Match the percentage of pregnancies expected to the number of services when using AI in cattle.
11. State reasons cattle do not settle.
12. State standard practices for using AI.
13. List errors in placing the inseminating tube in a cow.
14. Inseminate a reproductive tract. (Job Sheet)

INFORMATION SHEET

ARTIFICIAL INSEMINATION

B-3

OBJECTIVE 1

Required Activities/ Resources
- Transparency Masters 1 and 2

Optional Activities/ Resources
- Video
- Visit an AI facility to view semen collection, processing, and AI techniques.
- Information on schools that offer AI courses.

Choose the word or phrase to complete statements about artificial insemination.

Start your discussion with the following question, "Why has so much time and effort been put into developing artificial insemination techniques?"

You will see two transparencies on procedures for inseminating a cow.

WORDS YOU SHOULD KNOW	
ampule	a small glass container that holds enough semen for one service (act of insemination or breeding)
artificial insemination	means of obtaining pregnancy without the use of a natural service; commonly referred to as AI
estrus	the period of the estrous cycle when the female is receptive to the male for breeding; also referred to as "in heat"
speculum	an instrument used to dilate (open or widen) a body opening
straw	a 2½ to 5-inch plastic straw that holds enough semen for one service

The primary purpose of artificial insemination (AI) in cattle is to use the semen from superior, performance-tested bulls to fertilize females and thereby improve herd quality. One ejaculation provides enough sperm to fertilize between 100 and 500 females. The economic benefit, increased livestock quality, is proven by the extensive use of AI in dairy cattle and the growing use of AI by beef and swine producers.

- **Sources of semen**
  - collecting from your own sires

- buying from a breeder or any of a number of companies specializing in the collection and distribution of semen

  ☞ **NOTE:** Breed associations provide lists of bulls and their Expected Progeny Differences (EPDs) to determine the breeding value of bulls. See Unit B-1, "Selecting and Breeding Livestock."

Advantages and disadvantages of AI

- **Advantages**
  - improves the quality of livestock
  - allows for the use of a wider selection of males than from your own herd
  - enables the long term storage of semen
  - reduces the spread of disease
  - reduces or eliminates the cost of keeping sires
  - coordinates well with heat synchronization programs
  - increases safety – you don't have to handle bulls if the semen is purchased
- **Disadvantages**
  - requires a skilled technician – an unskilled technician may damage the reproductive tract of females
  - requires closer supervision of females – cattle must be checked two or three times a day to detect estrus
  - requires equipment, including specialized handling facility
  - insemination equipment must be properly sterilized

Overview of AI procedure

- Raw semen is diluted in order to enable proper freezing and to serve more females.
- The processed semen is cooled to 40° F (4.4°C) and placed in plastic straws. The straws are then placed into liquid nitrogen containers where the diluted semen freezes. The frozen straws can be stored in liquid nitrogen indefinitely until they are

used. At that time, the frozen semen is thawed and used to inseminate females.

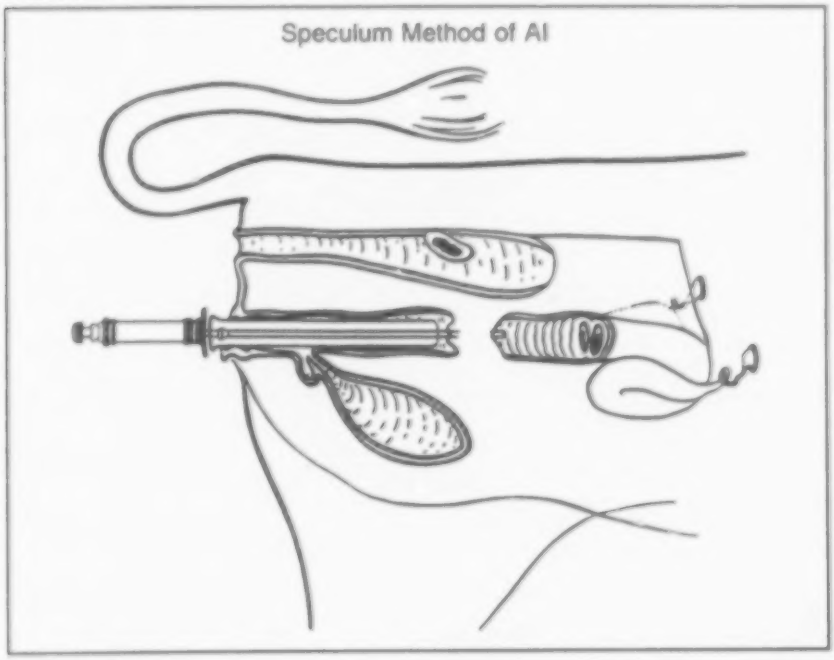
☞ **NOTE:** The temperature inside the liquid nitrogen containers is below -320° F (-196°C).

- **AI methods**

  - **speculum** – A plastic speculum about a foot long and 1½ inches in diameter is inserted into the reproductive tract as far as the cervix. The semen is then deposited in the uterus through a small gun about 16 inches long with a syringe on the end. The speculum method is generally used on ewes. (Figure 1)

    ☞ **NOTE:** The speculum method of AI can be used on cows, but it is not as effective as the retrovaginal method, which places the semen deep inside the cervix.

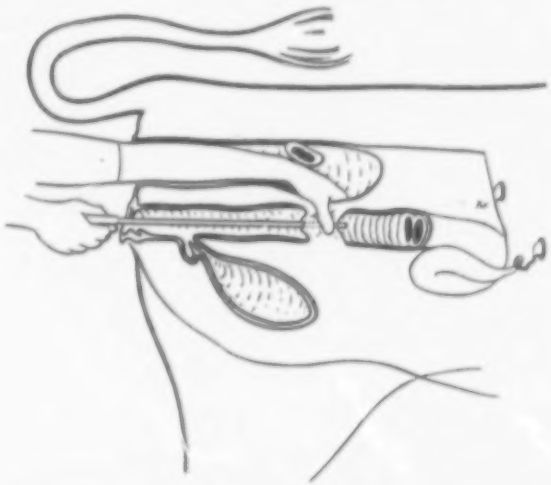
FIGURE 1



  - **retrovaginal** – The technician inserts his or her hand into the rectum and locates the cervix through the wall of the rectum. The inseminating gun is inserted into the reproductive tract and guided past the cervix. The semen is deposited in the uterus. The retrovaginal method is generally used with cows. (Figure 2)

FIGURE 2

Retrovaginal Method of AI



☞ **NOTE:** You will be performing this procedure in the Job Sheet.

- **artificial penis** – An artificial penis is inserted into the reproductive tract. Semen is deposited in the uterus once the penis passes the cervix. The artificial penis is used with sows.

Use of AI among livestock industries

- **dairy cattle** – More than 70% of dairy cattle are impregnated using AI, resulting in significant production gains. Dairy cattle are handled regularly, making the AI procedure relatively easy.

- **beef cattle** – With 5-10% use in beef cattle, AI is increasing in popularity. The beef industry has historically placed barriers on the use of AI because of the impact that AI has on bull values. Beef producers like the benefits of using a superior sire, so as industry barriers are reduced, AI will be used more frequently.

- **swine** – AI has become popular with large swine producers. Due to the nature of swine production, where sows are continuously coming into heat, the majority of AI is performed with fresh semen (semen that has not been frozen). Until recently, scientists have had difficulty freezing boar semen.

- **sheep** – AI is used infrequently with sheep because of the high labor costs, the difficulty in determining estrus, the low conception rates, and the lack of sire records.

- **turkeys** – AI is used almost exclusively in turkey production, over 90%. Breeders have had tremendous success in developing turkey carcasses. In fact, the size of their bodies makes natural reproduction difficult.

OBJECTIVE 2

Describe how AI equipment is used. (Figure 3)

Required Activities/ Resources
– Display and demonstrate AI equipment.

Optional Activities/ Resources
– Visit an artificial insemination company to observe how AI equipment is used.

You will see the equipment used in artificial insemination.

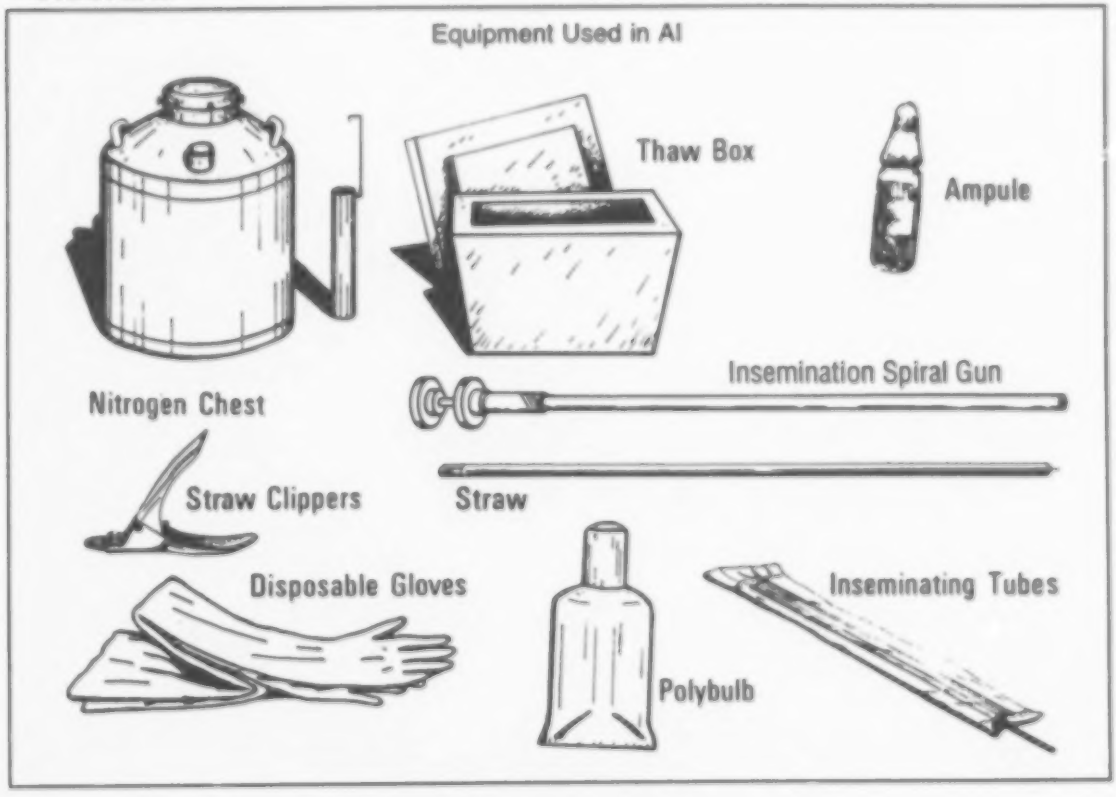
- **nitrogen chest** – used to store straws and/or ampules

- **thaw box** – used to thaw straws and/or ampules

- **inseminating gun** – used to deposit semen in uterus (when using straws for semen storage)

- **inseminating tube** – used to deposit semen in uterus (when using ampules for semen storage)

FIGURE 3



- **polybulb** – used to draw semen from straw and to deposit semen in uterus (when using ampules for semen storage)
- **speculum** – used to open the reproductive tract as far as the cervix
- **straw clippers** – used to snip off the end of the straw
- **straw** – used to store semen
- **ampule** – used to store semen

OBJECTIVE 3

List factors that contribute to poor conception rates.

Optional Activities/ Resources
– Visit with a breeder about conception rates.

Factors that contribute to a poor conception rate include:

- improper timing – inseminating before or after the time of optimum conception in the estrous cycle
- diseases

  EXAMPLES: vibriosis, vaginitis, trichomoniasis, Bang's disease
- poor insemination technique
- management failure
- ovulation failure

OBJECTIVE 4

Choose the word or phrase to complete statements about semen.

Optional Activities/ Resources
– Using straws, ampules, and semen samples, compare color, consistency, smell, and other characteristics.

Bull semen has the following characteristics:

- **color** – generally white to cream, but may range from clear to yellow

  ☞ **NOTE:** A watery color can indicate low sperm count.
- **volume** – from five to six cubic centimeters
- **pH** – range from 6.5 to 6.9

- **concentration** – varies among males, according to:
  - age of the male
  - season of the year
  - health of the animal
  - frequency of ejaculation
- **viability** – refers to the mobility characteristics of thawed semen

  ☛ **NOTE:** Breeders and veterinarians should only use semen that is viable after thawing. Most semen collectors store only semen that has been tested and has acceptable viability levels when thawed.
- **grade**
  - **satisfactory** – semen that has a good density as indicated by a milky white ejaculation; can settle most females

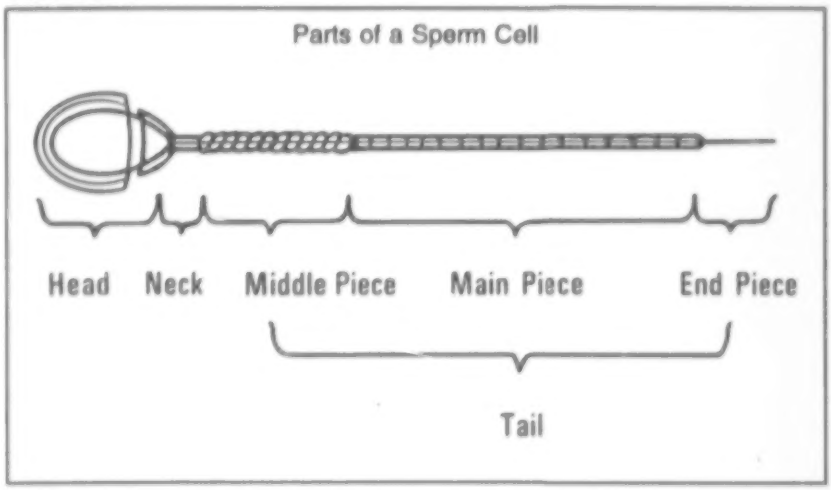
    ☛ **NOTE:** Generally, only satisfactory semen would be used for AI.
  - **unsatisfactory** – semen that has a single or combination of low values for density, mobility, and rate of movement; can settle less than one-half of females

OBJECTIVE 5

Optional Activities/ Resources
- Examine sperm under a microscope and identify the parts of the cell.

Choose the word or phrase to complete statements about semen cells.

FIGURE 4



Normal sperm (Figure 4)

- **head** – stores genetic material
- **neck** – attaches head to tail
- **middle piece** – serves as a storage house for energy
- **tail** – propels the sperm

Abnormal sperm

- tailless head
- two heads
- two tails
- pear-shaped head

OBJECTIVE 6

Optional Activities/ Resources
- Research the current cost of semen sources.
- Write to the CSS requesting information on AI.
- Research AI training opportunities.
- Write breed associations requesting information on EPDs.

Choose the word or phrase to complete statements about standards and sources.

WORDS YOU SHOULD KNOW	
EPD (Expected Progeny Difference)	a prediction of how future progeny will perform; EPDs are records of specific traits published by breed associations
global market	worldwide buying and selling

- AI services include businesses that collect and store semen, that inseminate females, and that market existing semen supplies. Generally a business will specialize in certain species. The integrity and practices of these businesses vary. Look for AI services that belong to Certified Semen Service (CSS), a division of the National Association of Animal Breeders. CSS members are inspected yearly for cleanliness, procedures, disease control, and record keeping.

  ☞ **NOTE:** You should always research any AI business before using its services.

- The semen market is a global market.

- In the United States, semen is stored almost exclusively in straws. No other method has shown similar semen survivability when thawed. The ampule is sometimes used in Europe and in many third-world countries.

- AI technicians take, as a minimum, a four-day course to learn the proper AI techniques. The level of experience directly affects the success of AI.

- Heat synchronization has become popular with livestock producers who are using AI. Heat synchronization enables easier scheduling of AI and reduced labor in detecting heat.

  ☞ **NOTE:** Heat synchronization is discussed in Unit B-1, objective 24.

- Straws containing bull semen cost, on average, $2 each to produce. The desirability of the semen determines the selling price. The selling price can exceed $300 for highly desired bulls, especially if the bull has died. Desirability is determined by the Expected Progeny Difference (EPD) records.

☞ **NOTE:** EPDs are discussed in Unit B-1, objective 13.

- Record keeping has improved the efficiency of AI. Accurate records enable you to make educated decisions.

OBJECTIVE 7

Optional Activities/ Resources
– Demonstrate thawing techniques.

Match methods of thawing semen in straws and ampules to their descriptions.

The following methods are used to thaw semen:

- **Straws**
  - **hot bath** – Place the straw in a water bath at 90° to 95°F (32° to 35°C) for **one minute**, then inseminate the female.

    ☞ **NOTE:** The majority of stud organizations (businesses that collect the semen) are recommending the hot bath technique for thawing semen. Check with your local semen supplier for the recommended method.
  - **ice bath** – Place the straw in a water bath at 37°F (2.8°C) for **eight to ten minutes**, then inseminate the female.
  - **no thaw** – Take the straw straight from the nitrogen tank and inseminate the female.
- **Ampules**
  - **hot bath** – Place the ampule in a water bath at 110°F (43°C) for **40 seconds**, then inseminate the female.
  - **ice bath** – Place the ampule in a water bath at 37°F (2.8°C) for **ten minutes**, then inseminate the female.

OBJECTIVE 8

Complete the Assignment Sheet.

OBJECTIVE 9

Discuss the importance of the estrous cycle in AI.

Required Activities/ Resources
– Transparency Masters 3 and 4

You will see transparencies on the estrous cycle of cows and the estrous cycle of sows.

WORDS YOU SHOULD KNOW	
ovulation	the point in time when the egg is released from the ovary

- The timing in AI is critical: AI will be more successful if the procedure is performed in the optimal breeding period during estrus because the egg can only survive for a few hours after being released from the ovary. Therefore, the optimal time to inseminate is prior to ovulation. Ovulation occurs at different points in the estrous cycle for different species. Animals have to be closely monitored to determine when estrus starts. (Figures 5 and 6)

FIGURE 5

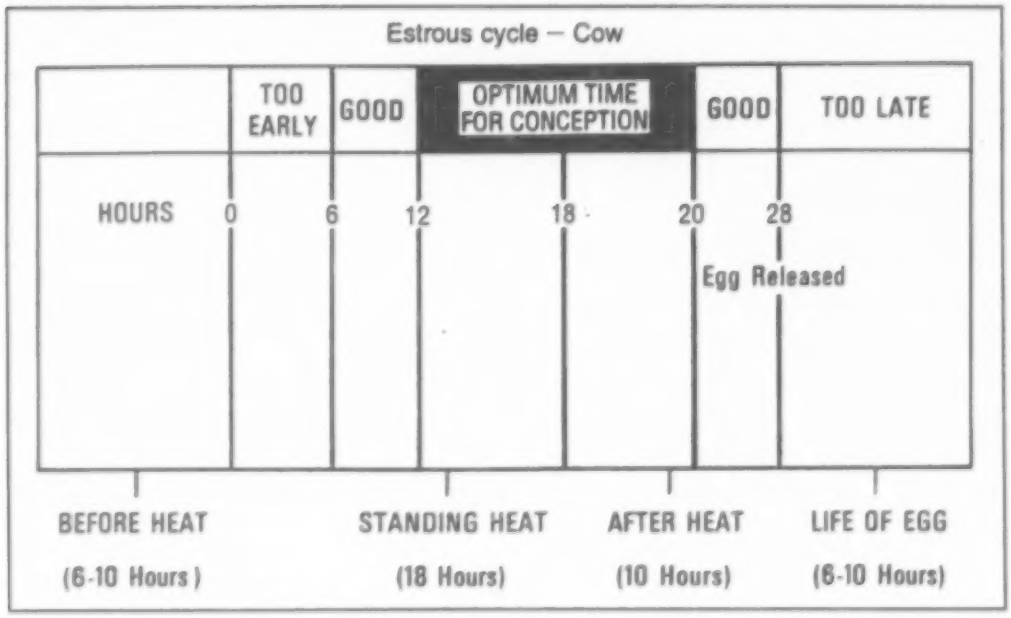
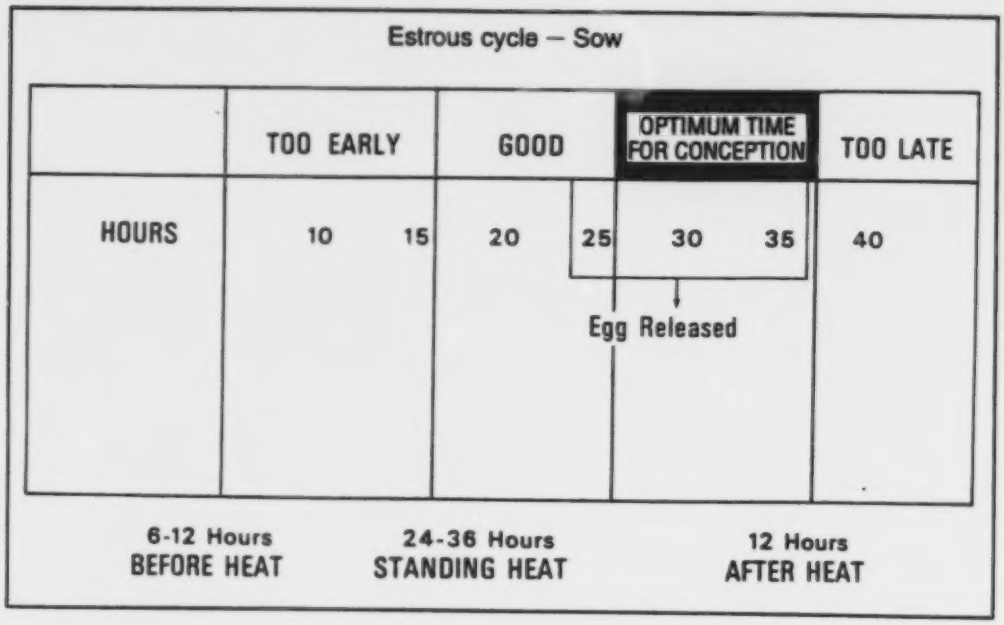


FIGURE 6



OBJECTIVE 10

Optional Activities/ Resources
– Visit with an AI technician about pregnancy success rates and factors that affect fertilization.

Match the percentage of pregnancies expected to the number of services when using AI in cattle.

Percentages of pregnancies expected:

- first service – 65% to 70%
- second service – 70% to 85%
- third service – 85% to 95%

☞ **NOTE:** The remaining 5% are problem cows and are not going to settle. They should be checked and culled if necessary.

OBJECTIVE 11

Optional Activities/ Resources
– Research reasons why ovulation may fail or be delayed and what types of nutritional deficiencies can interrupt the estrous cycle.

State reasons cattle do not settle.

WORDS YOU SHOULD KNOW	
settle	to cause a female to become pregnant; referred to as, "a bull settles a cow"

Cattle fail to settle due to:

- ovulation failure
- delayed ovulation
- defective sperm

  ☑ **NOTE:** Sperm may be defective because it is low quality or because it was killed during thawing by improper thawing techniques.

- the failure of the follicle to rupture and release the egg
- nutritional deficiencies interrupting the estrous cycle
- disease
- physical defects

OBJECTIVE 12

State standard practices for using AI.

Optional Activities/ Resources
– Visit an AI facility to observe standard practices.

- Check with breed associations regarding the use of AI.
- Check animals twice a day to detect females in heat (once in the morning and once in the evening).
- Provide good handling facilities.
- Handle the animals gently.
- Use a qualified technician to inseminate animals.
- Inseminate animals within the optimum breeding time.
- Use a good identification system and keep accurate records of the breeding date and the birthing date.

OBJECTIVE 13

List errors in placing the inseminating tube in a cow. (Figure 7)

Required Activities/ Resources
– Transparency Master 5

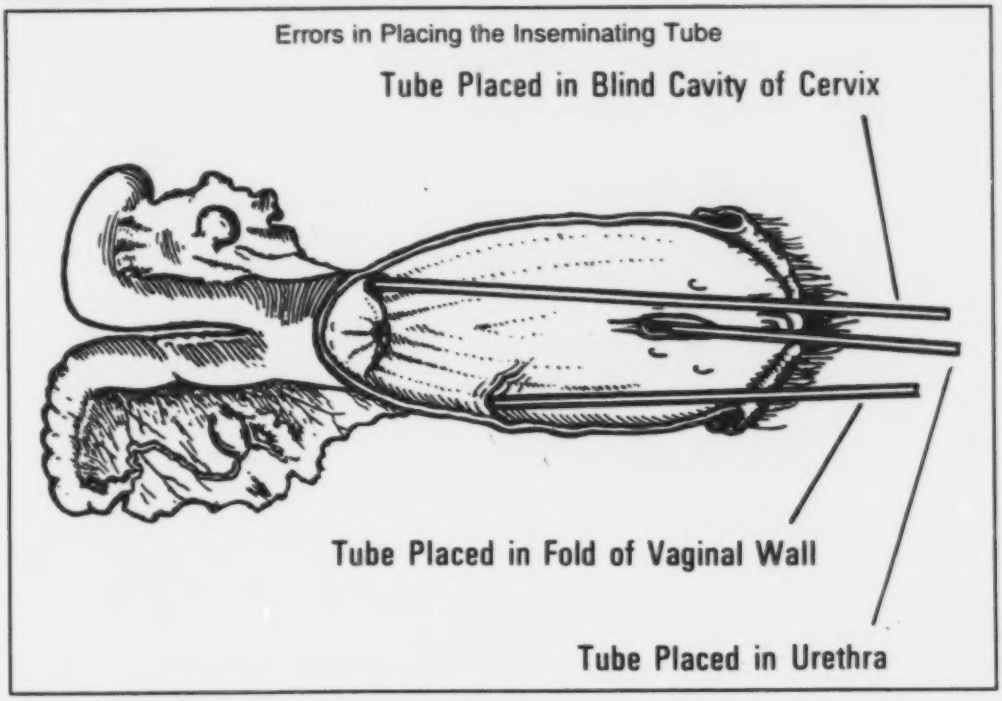
Optional Activities/ Resources
– Talk with an AI technician about insemination errors.

You will see a transparency on errors in placing the inseminating tube in a cow.

☑ **NOTE:** The same errors occur when using an inseminating gun.

- placing the tube in the blind cavity of the cervix
- placing the tube in the urethra
- pushing the tube too far into the uterus so the sperm is deposited in one uterine horn
- placing the tube in the fold of the vaginal wall
- letting the tube slip back into the cervix

FIGURE 7


Errors in Placing the Inseminating Tube
Tube Placed in Blind Cavity of Cervix
Tube Placed in Fold of Vaginal Wall
Tube Placed in Urethra

OBJECTIVE 14 **Complete the Job Sheet.**

ASSIGNMENT SHEET	*ARTIFICIAL INSEMINATION*	**B-3**

Name _____ Score _____

OBJECTIVE 8

Examine semen for viability and abnormalities.

EQUIPMENT AND SUPPLIES

- Semen sample
- Microscope

INSTRUCTIONS

You will check a sample of semen under the microscope for viability and to determine if any of the sperm cells are abnormal. When you are finished with the evaluation, complete the lab sheet below and turn it in to your instructor for grading.

Operation and Calculation
- Calculate with whole numbers

General Science
- Use scientific instruments (microscope)

Life Science
- Investigate/apply principles of anatomy/physiology

Lab Sheet
Semen Evaluation

Semen sample number: _____

Color of semen: _____

Viability of sperm cells:

Number of live (moving) cells _____

Number of dead cells (no movement) _____

Total number of cells _____

Calculate the percentage of live sperm: _____ %
(Divide the number of live cells by the total number of cells.)

Number of abnormal sperm. Count the number of abnormal sperm.

Pear-shaped head: _____

Tailless head: _____

Two heads: _____

Two tails: _____

JOB SHEET	ARTIFICIAL INSEMINATION	B-3

Name _____

OBJECTIVE 14

Inseminate a reproductive tract.

EQUIPMENT AND SUPPLIES

- Disposable glove
- Inseminating gun (often referred to as AI gun)
- Bottle of dye
- Scissors
- Box with paper towels
- Dead cow tract

☞ **NOTE:** Your instructor will modify the procedure if you are using an inseminating tube instead of an inseminating gun.

PROCEDURE

Functional Reading
- Follow written instructions
- Interpret graphics and symbols

Life Science
- Investigate/apply principles of anatomy/physiology

Job Acquisition/ Development
- Master specific job task/procedure
- Practice good work habits/attitudes

	Yes	No
1. Read and understand the entire procedure before beginning. If you have any questions about the procedure, ask your instructor before you begin.	____	____
2. Remove jewelry and wash your hands in warm water.	____	____
3. Place a disposable glove on your left arm. If you are left-handed, place the glove on your right arm.	____	____
4. Fill a straw with some dye.	____	____
5. Place the straw into the inseminating gun.	____	____
6. Place your left hand over the cervix as if your arm were in the cow's rectal tract.	____	____
7. Using your right hand, insert the inseminating gun into the vulva and guide the gun through the three rings of the cervix.	____	____
8. When you are past the third ring of the cervix, depress the plunger at the end of the inseminating gun.	____	____

	Yes	No
9. Remove the inseminating gun.	____	____
10. Cut open the tract with your scissors to locate the point where the dye was deposited.	____	____
☛ **NOTE:** The dye should be deposited between the third and the forth rings of the cervix.		
11. Have your instructor check your work.	____	____
12. Clean and put away tools and materials and clean up the work area.	____	____

SKILL TEST RECORD

EVALUATOR'S COMMENTS

_____

_____

_____

PRODUCT EVALUATION

Evaluator note: Rate the student on the following criteria by circling the appropriate numbers. Each criterion must receive a rating of "3" or higher to demonstrate student mastery. (See Key below.) A student who is unable to demonstrate mastery should review the material and submit another product for evaluation.

Criteria:

Inserted gun properly	4	3	2	1
Deposited dye properly	4	3	2	1

AVERAGE RATING

Evaluator note: To obtain an average rating for the Competency Profile, total the points in Product Evaluation and divide by the total number of criteria. Circle the rating on the Key.

KEY

4 **Skilled** – Can perform job with no additional training.
3 **Moderately Skilled** – Has performed job during training program; limited additional training may be required.
2 **Limited Skill** – Has performed job during training program; additional training is required to develop skill.
1 **Unskilled** – Is familiar with process, but is unable to perform job.

EVALUATOR'S COMMENTS

_____

_____

_____

OBJECTIVE SHEET

FERTILITY AND PREGNANCY TESTING

B-4

INTRODUCTION

Proper monitoring of both fertility and pregnancy provides a cost-effective method of maintaining the quality and productivity of your stock. Your goal is to learn the techniques and procedures necessary to test the fertility and pregnancy of your stock.

PREREQUISITES

Unit B-2, "Reproductive Organs"
Unit B-3, "Artificial Insemination"

FOCUS ASSIGNMENTS

Reading Comprehension
- Gain factual information
- Analyze cause and effect
- Draw conclusions

Research and Reference
- Use standard references

Language
- Use standard grammar, spelling, and capitalization
- State ideas clearly

Composition
- Use complete sentences

FOCUS ASSIGNMENTS	
PREREADING:	Read *Fertility Testing Rams Increases Profits*, by Gerald Q. Fitch. OSU Extension Facts No. CR-3803.
WRITING:	Look up and write definitions for *motility*, *morphology*, and *epididymis*. Write a short essay (one paragraph to one page) about how fertility testing increases profitability.

UNIT OBJECTIVE

After completing this unit, you will show the following competencies by mastering the activities on the Assignment and Job Sheets and by scoring at least 85% on the Written Test.

SPECIFIC OBJECTIVES

1. Choose the word or phrase to complete statements about fertility and pregnancy testing.
2. Discuss methods of pregnancy testing.

3. Develop a chart showing pregnancy testing methods of different species. (Assignment Sheet)

4. List indications of pregnancy in a rectal examination.

5. Pregnancy test a cow using a rectal examination. (Job Sheet)

6. Select information about the stages of pregnancy.

7. Discuss fertility testing in males.

INFORMATION SHEET	*FERTILITY AND PREGNANCY TESTING*	**B-4**

OBJECTIVE 1

Required Activities/Resources
- Transparency Master 1

Optional Activities/Resources
- Talk with a successful livestock manager.

Choose the word or phrase to complete statements about fertility and pregnancy testing.

Discuss the question, "Why are fertility and pregnancy testing important?"

You will see a transparency of a cow's reproductive system.

WORDS YOU SHOULD KNOW	
sterility	the temporary or permanent inability to reproduce
conception	the female and male germ cells merge and fertilization occurs
palpation	examination by touching
fetus	the unborn young in the uterus
fertility testing	method for evaluating the breeding soundness of males; method for detecting infertility
pregnancy	the period during which a developing fetus is carried inside the uterus
open	a female that is not pregnant
rectal Doppler technique	a rectal-probe pregnancy test that uses sound to detect fetal heartbeat

- Fertility and pregnancy testing provide cost-effective methods of determining the reproductive capacity of animals.
- **Advantages of pregnancy testing**
  - provides early warning of breeding troubles
  - enables you to rebreed nonpregnant females

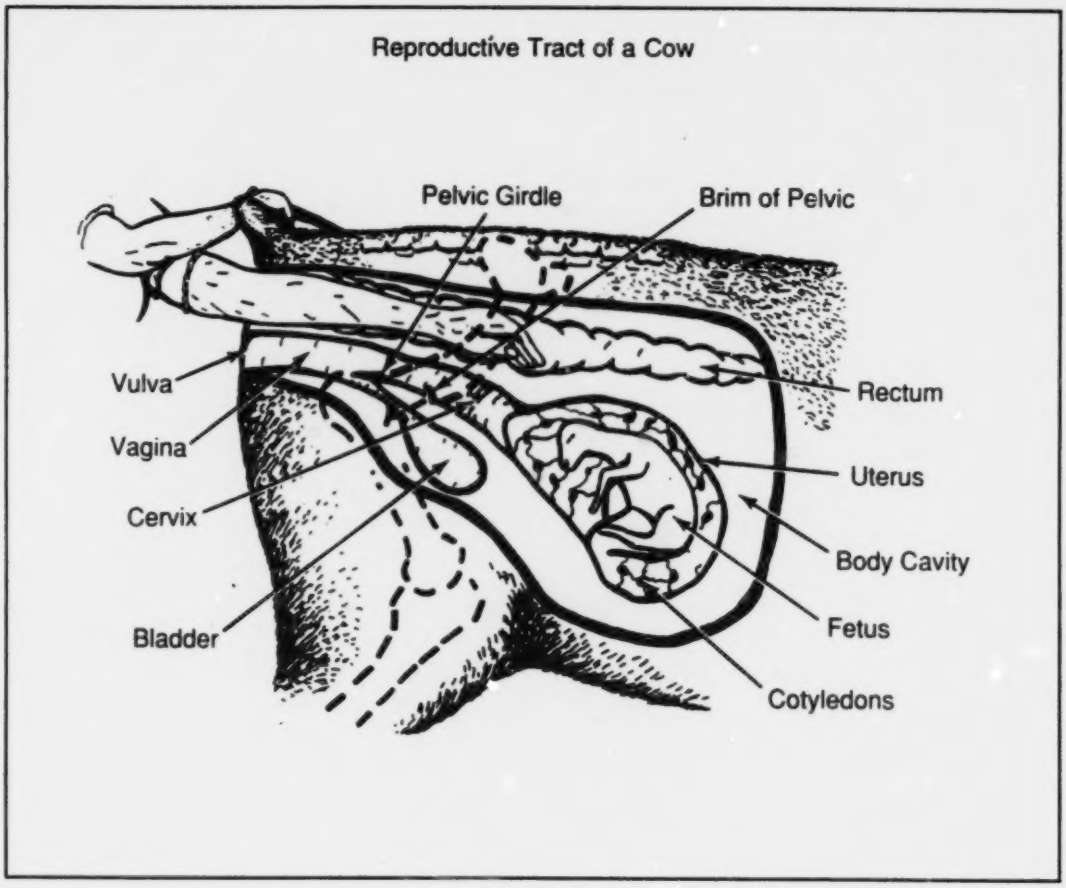
- enables separation of pregnant and nonpregnant females to assure proper nutrition and husbandry
- provides means of culling females from herd
- increases your profits
  - Purebred animals will bring more money if they are known to be safely with a fetus.
  - Slaughter animals will bring a higher return if they are known to be open. The uterus and the fetus add weight that a slaughterhouse can't convert to product.
  - Unproductive breeders can be culled from breeding stock.

- **Disadvantages of pregnancy testing**
  - health risk to the dam and fetus if the proper procedure isn't followed
  - labor and equipment costs associated with the procedure

- **Advantages of fertility testing**
  - prevents the loss of the offspring crop
  - increases the offspring crop
  - provides the means for selecting males
  - provides the means for culling infertile males
  - shortens the birthing season
  - increases your profits

- Review of the parts of a cow's reproductive tract

FIGURE 1



OBJECTIVE 2

Discuss methods of pregnancy testing.

Optional Activities/Resources
- Review the sow and ewe reproductive tracts using the appropriate transparencies from Unit B-2, "Reproductive Organs."
- Display the equipment used for various pregnancy testing techniques.
- Visit a clinic to observe techniques.

Pregnancy testing of cows

☑ **NOTE:** The reliability of pregnancy testing is directly related to the skill of the technician.

- **Rectal palpation**
  - Rectal palpation is the primary method.
  - Insert your gloved hand into the rectum and palpate the uterus through the wall of the rectum.
  - Perform after 42 days from breeding.

- **Analysis of progesterone levels in the milk**
  - Pregnant cows maintain a *higher level of progesterone* in their blood and milk.
  - Progesterone analysis is not as common as rectal palpation.

Pregnancy testing of ewes

- **Ultrasonic scanning**
  - A small, portable ultrasonic scanner passes sound waves through the body. The scanner uses echoes to determine pregnancy.
  - The test is performed 51 to 70 days after breeding.
- **Rectal Doppler technique** – A rectal probe is used to measure the heart beat of the fetus or fetuses.
- **Rectal-abdominal palpation** – A 16-inch rod is inserted into the ewe's rectum. The rod is pushed towards the abdominal wall where the technician palpates the reproductive organs through the ewe's skin.

Pregnancy testing of sows

- **Ultrasonic scanning**
  - same as ultrasonic testing of ewes
  - may be performed any time after 35 days after breeding

OBJECTIVE 3

Complete the Assignment Sheet.

OBJECTIVE 4

List indications of pregnancy in a rectal examination.

Optional Activities/Resources
- Talk with a technician or vet about the relative ease of determining pregnancy using the four indicators.

- The membrane of the sac will slip in your fingers when you manipulate the fetus through the uterine wall.
- Check for the presence and size of cotyledons.
- Check for presence of the fetus.
- The diameter of the uterine artery increases, making it possible to detect a pulse (Fremitus).

OBJECTIVE 5

Complete the Job Sheet.

OBJECTIVE 6

Select information about the stages of pregnancy.

Required Activities/Resources
- Transparency Master 2

Optional Activities/Resources
- Talk with a technician or vet about their experiences in determining the stages of pregnancy.
- Examine preserved fetuses in different stages of development.
- Visit a local ranch and palpate cows in various stages of pregnancy.
- Video

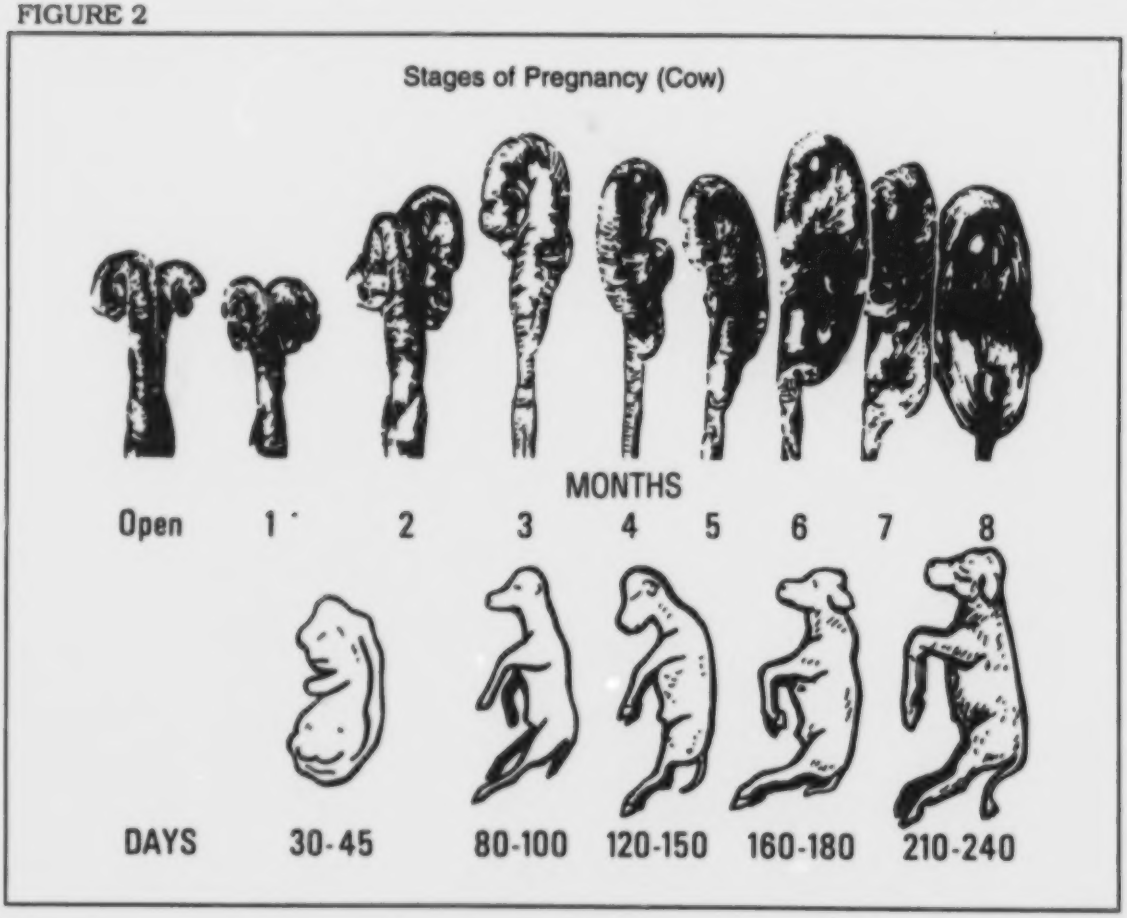
You will see a transparency of the stages of pregnancy in cows.

- You can estimate the length of a cow fetus by squaring the month of gestation and dividing by two.

  EXAMPLE: $4 \times 4 = 16$ $\quad 16 \div 2 = 8$
  If the cow has been bred four months, then the fetus should be eight inches long.

- **Physical indicators of stages of pregnancy in cows** (Figure 2)
  - 30-45 days – The fetus is the size of a thumb.
  - 80-100 days – The fetus is positioned on the pelvic floor. The uterine horn is usually the size of a boxing glove.

FIGURE 2



- 120-150 days – The legs of the fetus are distinguishable. There is less fluid in the uterine horn. The uterine horn membrane is thicker.

- 160-180 days – The calf is pulled over the pelvic girdle and positioned on the floor of the body cavity. This is the hardest period to accurately detect the age of the fetus.

- 210-240 days – The calf is positioning itself for calving. This stage is easy to detect.

- **Stages of growth using mass in relation to days of gestation**

  COWS (based on the average mass of a single fetus)

  - 120 days – 0.7 kg (1.54 lbs)
  - 150 days – 2.3 kg (5.06 lbs)
  - 240 days – 20.4 kg (44.88 lbs)
  - 270 days – 36.3 kg (79.86 lbs)

  SHEEP (based on the average mass of one fetus when the female is carrying twins)

  - 60 days – 0.1 kg (0.22 lbs)
  - 100 days – 1.0 kg (2.2 lbs)
  - 120 days – 2.6 kg (5.72 lbs)
  - 145 days – 4.5 kg (9.9 lbs)

  SWINE (based on the average mass of each fetus in a litter)

  ☑ **NOTE:** The number of developing fetuses directly affects the size of individual fetuses at term.

  - 51 days – 0.06 kg (0.13 lbs)
  - 74 days – 0.20 kg (0.44 lbs)
  - 97 days – .80 kg (1.76 lbs)
  - 114 days – 1.13 kg (2.47 lbs)

OBJECTIVE 7

Discuss fertility testing in males.

Optional Activities/Resources
- Visit a semen collection facility.
- View semen samples under a microscope.
- Review applicable objectives in Unit B-3, "Artificial Insemination."

- **Primary causes of sterility and delayed breeding**
  - low quality semen
  - physical defects and injuries
  - psychological condition
  - infection and disease
  - poor management and feeding
  - inherited abnormalities
- **Grades of semen** (Table 1)

☞ **NOTE:** Semen grades are similar for bulls, rams, and boars.

TABLE 1 GRADES OF SEMEN

GRADE	DESCRIPTION	CAPABILITY
Satisfactory	semen that has a good density	can settle most females
Unsatisfactory (Cull)	semen that has a single or combination of low values for density, mobility, and rate of movement	can settle few, if any, females

☞ **NOTE:** Semen should be examined under a microscope to determine the grade and rechecked before culling the animal. Males that produce unsatisfactory semen should be treated as soon as possible.

- **Times when semen should be checked**
  - just prior to the breeding season – By testing at this time, you can identify sterile or near-sterile males before they are expected to settle females.
  - soon after breeding season – Semen collected at the end of the breeding season should be evaluated carefully because heavy service temporarily lowers the semen quality in most males.

- **Methods of collecting semen**

  ☑ **NOTE:** Generally, semen is collected by vets or by specialized companies. It is unlikely that you would collect semen on your own.

  - **artificial vagina** – The male is trained to mount a dummy female. An artificial vagina is inserted over the male's penis and collects the ejaculated semen. This method is used to collect semen from bulls, rams, and boars.

  - **electrical stimulation** – Electrodes carrying a weak current are placed into the male's rectum. The stimulus causes an ejaculation which is collected. Electrical stimulation is used with bulls and rams.

  - **rectal massage of ampullae** – The seminal vesicles and internal genitals (ampullae) are massaged by one technician. A second technician collects the ejaculated semen in a funnel leading to a glass tube. Rectal massage of ampullae is used with bulls.

ASSIGNMENT SHEET

FERTILITY AND PREGNANCY TESTING

B-4

Name _____ Score _____

OBJECTIVE 3

Develop a chart showing pregnancy testing methods of different species.

Optional Activities/Resources
- Video
- Additional activities/resources in Instructor's Guide

INSTRUCTIONS

This assignment has two parts. You will construct a table in Part 1, then use the table to answer questions in Part 2.

Composition
- Construct graphics and symbols

Part 1

On a separate piece of paper, create a table that displays the following information for cows, swine, and ewes:

- the types of pregnancy tests available
- the most common method used
- the number of days after conception that the test should be performed

Operation and Calculation
- Calculate with whole numbers

Math Application
- Solve word problems

Data Analysis and Display
- Interpret charts and tables
- Construct charts and tables

Functional Math
- Solve practical problems

Make the chart neat and easy to read. Include a title and appropriate headings for the columns.

Part 2

Using the chart you made in Part 1, answer the following questions. You should be able to answer all of the questions using only your table.

1. If Marsha bred her prize sow on April 15, when would she perform a pregnancy test?

_____

2. Fred bred his cows on April 1. He plans to perform a pregnancy test on April 20 in order to be at his son's wedding in another state. Will this be a reliable test? Why or why not?

_____

_____

_____

3. a. If ewes are bred on June 1, when should they be tested?

_____

b. If you practice the same method as most sheep producers, what method will you use?

_____

4. Mark has just diversified to swine production. He wants to use rectal palpation like he does with his Holsteins. What is your advice to Mark?

_____

_____

JOB SHEET	*FERTILITY AND PREGNANCY TESTING*	**B-4**

Name _____

OBJECTIVE 5

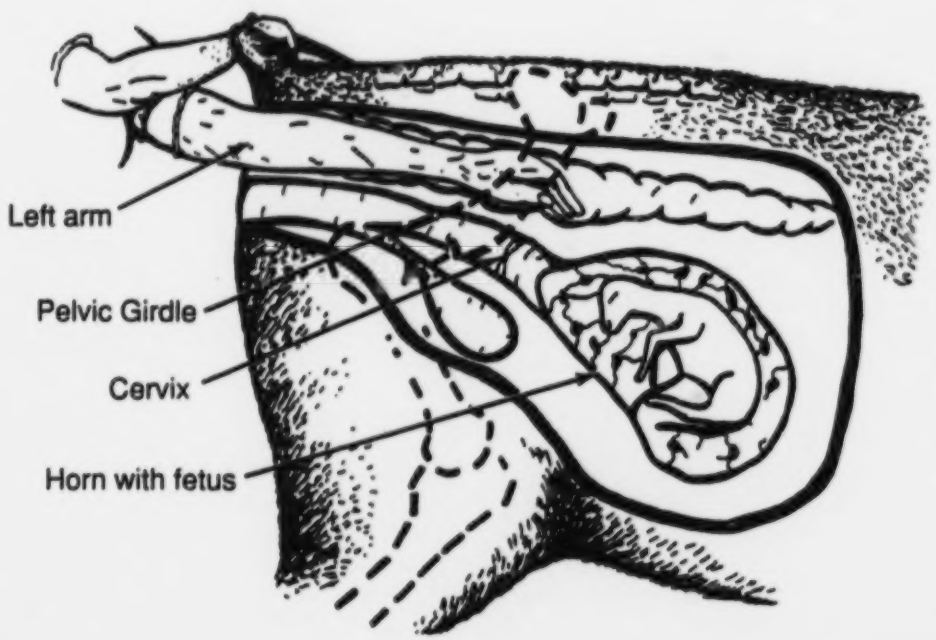
Pregnancy test a cow using a rectal examination.

EQUIPMENT AND SUPPLIES

- chute
- plastic sleeves
- lubricant
- disinfectant or soap
- water
- rags or paper towels
- cow showing indications of pregnancy

FIGURE 1

Hand and Finger Positions for Palpation



PROCEDURE

Functional Reading
- Follow written instructions
- Interpret graphics and symbols

Life Science
- Investigate/apply principles of anatomy/physiology

Job Acquisition/ Development
- Master specific job task/procedure
- Practice good work habits/attitudes

	Yes	No
1. Place the cow into a chute.	____	____
2. Clean and disinfect the rectal area with soap and water using rags or paper towels.	____	____
3. Remove your jewelry and scrub your hands and arms thoroughly with soap and water.	____	____
4. Place a plastic glove on your palpation hand.	____	____
5. Wet the plastic glove with water and apply the lubricant.	____	____
6. Grasp the cow's tail with your free hand and move the tail to the side of the cow.	____	____

⚠ **WARNING:** INSERT YOUR HAND SLOWLY INTO THE RECTUM. Improper insertion can cause damage to the cow or the fetus.

7. Insert your palpation hand and arm into the cow's rectum to a depth of approximately six inches.	____	____
8. Remove feces as needed, so you can palpate with your fingers.	____	____
9. Locate the cervix and position your hand in the same manner as in artificial insemination.	____	____

☞ **NOTE:** Review Unit B-3, "Artificial Insemination," if needed.

10. Notice the position of the cervix in relation to the pelvic girdle.	____	____

☞ **NOTE:** If the cervix is not found on the pelvic girdle at an approximate depth of six inches, it is a good indication that the cow could be pregnant. If this is the case, while holding the cervix in your hand, attempt to pull it back up on the floor of the pelvic girdle for easier palpation.

	Yes	No
11. Keeping a firm hold on the reproductive tract, move your hand slowly down the tract to the point where the uterus separates into two uterine horns.	____	____

WARNING: DO NOT SQUEEZE THE HORNS. Simply rub or palpate each one. Excessive squeezing or palpating could cause damage to the cow or the fetus.

12. Palpate each horn to determine if one horn is larger than the other.	____	____
☞ **NOTE:** Do not let go of the tract because you might forget which horn you are palpating.		
13. Determine if the cow you are examining is pregnant.	____	____
14. Identify the stage of pregnancy.	____	____
☞ **NOTE:** Refer to Objective 7, if needed.		
15. Have your instructor check your work.	____	____
16. Clean and put away tools and materials and clean up the work area.	____	____

SKILL TEST RECORD

EVALUATOR'S COMMENTS

_____

_____

_____

PRODUCT EVALUATION

Evaluator note: Rate the student on the following criteria by circling the appropriate numbers. Each criterion must receive a rating of "3" or higher to demonstrate student mastery. (See the Key below.) A student who is unable to demonstrate mastery should review the material and submit another product for evaluation.

Criteria:

Observed safety precautions	4	3	2	1
Proceeded in an appropriate and timely manner	4	3	2	1
Correctly identified the stage of pregnancy	4	3	2	1

AVERAGE RATING

Evaluator note: To obtain an average rating for the Competency Profile, total the designated points in Product Evaluation and divide by the total number of criteria. Circle the rating on the Key.

KEY

4 **Skilled** – Can perform job with no additional training
3 **Moderately Skilled** – Has performed job during training program; limited additional training may be required
2 **Limited Skill** – Has performed job during training program; additional training is required to develop skill
1 **Unskilled** – Is familiar with process, but is unable to perform job

EVALUATOR'S COMMENTS

OBJECTIVE SHEET	*BIRTH ASSISTANCE*	**B-5**

INTRODUCTION

Calving, lambing, and farrowing are critical stages in livestock management. Your goal is to deliver healthy babies and keep mothers who are able to breed again in the next season. Most deliveries follow a natural, predictable pattern with no difficulties. However, when difficulties do occur, you have to be able to identify the problem and handle it if you can. You must be aware of your own limits and know when you can assist with the birth and when you should call a veterinarian.

PREREQUISITES

Unit B-2, "Reproductive Organs"

FOCUS ASSIGNMENTS

Reading Comprehension
- Gain factual information
- React to written material
- Draw conclusions

Research and Reference
- Use standard references

Language
- Use standard grammar, spelling, and capitalization
- State ideas clearly

Composition
- Use complete sentences
- Compose essays

FOCUS ASSIGNMENTS	
PREREADING:	Read one of the following: "Understanding Normal Parturition" in *Calving Management*, OSU Cooperative Extension Circular E-906, pages 20-21 and the top of 22. "Birth and the Newborn" in *Sheep Health Handbook*, by Thomas R. Thedford, DVM, pages 107-110; or "Ewe Management" and "Ewe and Lamb Management" in *Sheep Health and Management*, OSU Extension Facts No. 3860. "Farrowing" adapted from "Farrowing: Causes and Events" by Dr. Robert P. Wettemann, prepared for the OSU Swine Farrowing School.
WRITING:	Look up and write the definitions for "parturition" and "dystocia." Write a short essay (one paragraph to one page) about your current level of ability and experience. Also, discuss the two areas of birth assistance that will be most interesting or most important to you in this unit.

UNIT OBJECTIVE

After completing this unit, you will show the following competencies by mastering the activities on the Job Sheets and by scoring at least 85% on the Written Test.

SPECIFIC OBJECTIVES

1. Choose the word or phrase to complete statements about parturition and *birth assistance.*
2. Match the stages of parturition to their characteristics, dams, and types of assistance.
3. Discuss dystocia.
4. Discuss chemicals and drugs needed to assist with the birthing process.
5. Identify basic instruments needed to assist with calving difficulties.
6. Describe how to perform a vaginal examination by hand.
7. Select actions to take for various calving and lambing positions.
8. Assist a cow in calving. (Job Sheet 1)
9. Assist a ewe in lambing. (Job Sheet 2)
10. Select normal birth averages for swine.
11. Discuss farrowing difficulties and the appropriate assistance.
12. Farrow a sow. (Job Sheet 3)
13. Discuss care of the newborn calf, lamb, and piglet.
14. Clip newborn piglets' needle teeth. (Job Sheet 4)

INFORMATION SHEET

BIRTH ASSISTANCE B-5

OBJECTIVE 1

Choose the word or phrase to complete statements about parturition and birth assistance.

Required Activities/Resources
- Discuss the similarities and differences in calving, lambing, and farrowing.

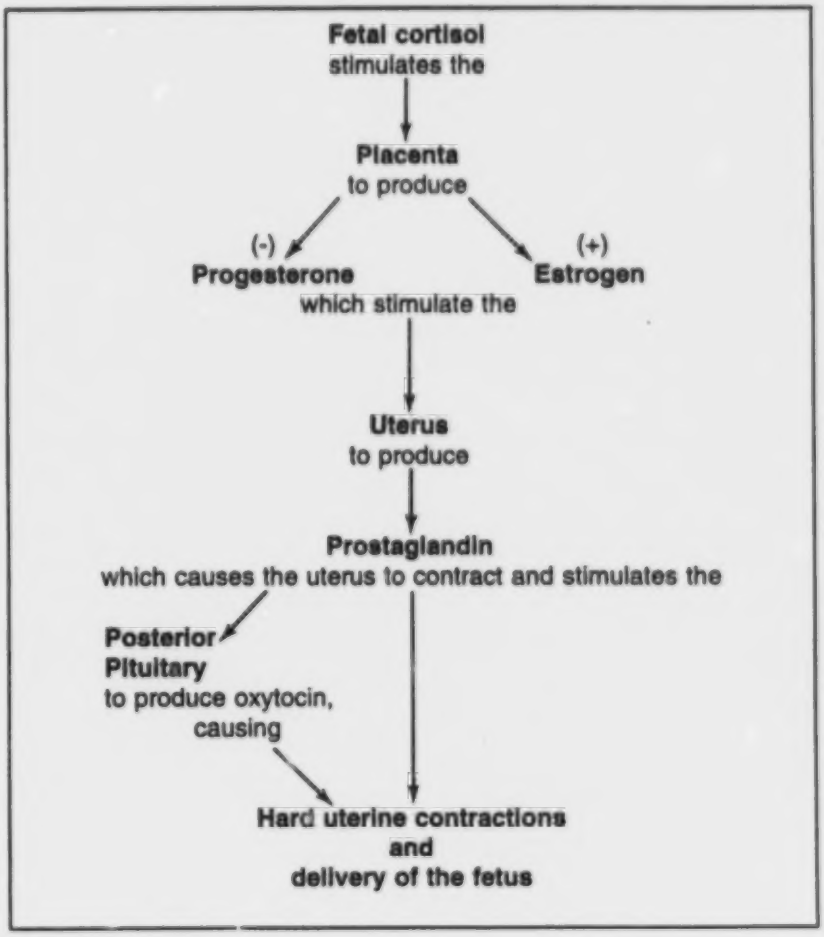
Optional Activities/Resources
- Share your experiences with birth assistance with the class.
- Videos
- Take notes from the video.
- Additional activities in Instructor's Guide

Start your discussion with the question, "What is the normal progression of the birth process?" To avoid repetition, this section discusses normal parturition in cattle; but the steps, stages, and birth process are essentially the same for all animals.

WORDS YOU SHOULD KNOW	
afterbirth	the placenta, fetal membranes, and fluids that are expelled from the uterus after delivery
colostrum	milk secreted by the udder for the first 48 hours after birth; contains a high concentration of antibodies which are passed to the offspring and which act to prevent infection
delivery	the passage of the fetus from uterus, through the birth canal, and out of the mother's body
dilation	to become wider or larger
fetus	unborn young in the uterus in the later stages of pregnancy
parturition	the birth process
placenta	an organ of blood vessels inside the uterus; serves as a storehouse of blood, oxygen, and nutrients for the fetus
umbilical cord	organ attached to the fetus at the navel and to the mother on the placenta; passes blood and nourishment from the mother to the fetus and waste material from the fetus to the mother

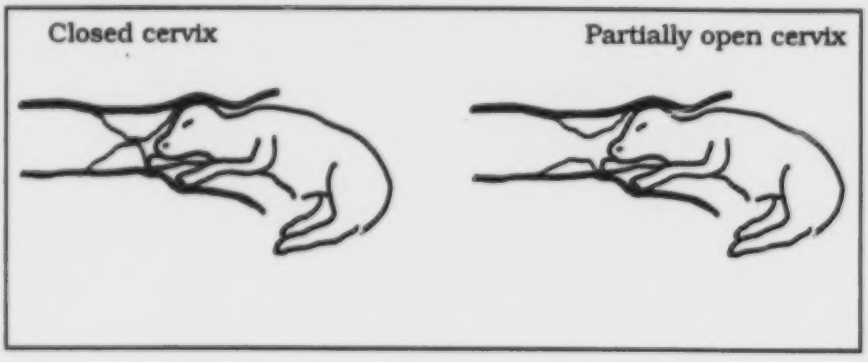
☞ **NOTE:** This objective contains information that will apply to Objectives 2, 3, and 13.

- **The variables determining labor**
  - the age of the mother
  - the season of the year: fall calving has a shorter duration than spring
  - the genetic characteristics of the sire and dam
- **The hormone chain reaction that stimulates parturition**



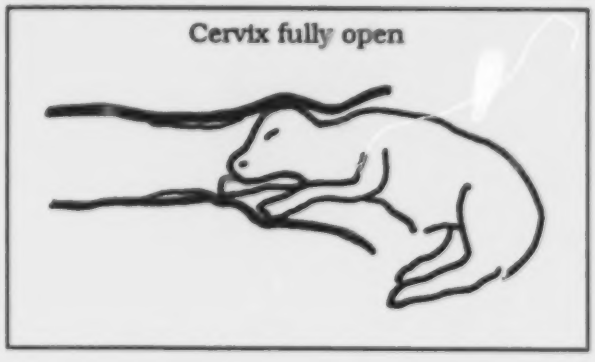
- **The three stages of parturition**
  - Stage I: Dilation of the cervix
    - onset: when the cervix starts to open (Figure 1)
      - The cervix is a strong, tough muscle. The fetus cannot move through the birth canal until the cervix is completely open. You can feel the degree of cervical dilation with your hand.

FIGURE 1



  - Stage II: Delivery of the calf
    - onset: appearance of the water bag; cervix is fully dilated and fetus moves into the birth canal (Figure 2)

FIGURE 2



    - normal parturition for a heifer – 1-1½ hrs (60-90 min)
    - normal parturition for a cow – ½-1 hrs (30-60 min)

- two reason heifers take longer

  a. Their pelvic area is smaller.

  b. Their tissues are tight and must stretch so the fetus can pass through the birth canal.

- Stage III: Shedding of the membranes; continues until all fluids and membranes are expelled from the uterus and the tissues return to normal

- **Acidosis and blood flow during delivery**

  Acidosis is a condition of too little oxygen and too much carbon dioxide caused by pressure during delivery. Blood flow is severely reduced during contractions, but blood floods into the fetus during relaxation. Even though the calf compensates for restricted oxygen by constricting blood flow to non-essential organs, all calves are born with slight acidosis. Rapid heartbeat and rapid breathing help restore a normal oxygen-CO_2 balance.

- **Normal conditions for newborn calves**

  - Heart rate: 100 beats/min

  - Normal, healthy calves have rapid respiration for a short period immediately after birth to distribute fresh oxygen to all their tissues.

  - Shortly after delivery, a healthy calf will:

    - shake its head
    - shiver to keep warm
    - normalize its breathing
    - look around and respond to the environment
    - get up

- A healthy calf begins to nurse within 30 minutes after delivery.

  - It is critical that the calf starts nursing right away so that it gets colostrum and can absorb antibodies to prevent infection.

    ☞ **NOTE:** The calf's ability to absorb the antibodies in the colostrum decreases within hours of delivery. After 24 hours, no antibodies are passed to the calf. The longer a calf delays nursing, the less chance you have for a calf that can resist infection and disease and keep your vet and medication costs down.

- Fetal injury is related to the length of time the calf is in the birth canal and the amount of pressure it experiences during delivery.

- **If a cow retains the placenta for 48 hours after delivery**

  - Consult your vet.
  - Administer an antibiotic.
  - **Do not pull out the placenta.**
  - If the cow has a fever or won't eat, call a vet.

- **Normal, healthy calves depend on quick delivery.**

- **Conditions that contribute to weak calves are:**

  - prolonged parturition
  - low colostrum

OBJECTIVE 2

Optional Activities/Resources
- Share your experiences with the birthing of pets or other animals.
- Talk with a rancher and/or a vet about the parturition and the assistance that might be required.

Match the stages of parturition to their characteristics, dams, and types of assistance. (Tables 1-3)

WORDS YOU SHOULD KNOW	
POP (Purified Oxytocin Principle;)	a naturally occurring hormone that can be injected to stimulate uterine contractions and milk let-down; pronounced P-OH-P

TABLE 1

STAGE I — DILATION OF THE CERVIX			
Dam	**Behavior**	**Duration**	**General Physical Changes**
Cow	• Nervousness • Switching and elevation of the tail • Toward the end of Stage I, lies down and gets up often, looks toward the rear; separates from the herd and moves to an isolated area	1-24 hrs	• Pelvis relaxes. • Cervical dilation and uterine contractions begin. • Heart and respiratory rates increase. • Teats fill. • Vulva swells and turns red. • Mucous discharge increases. • Near the end of Stage I, the water sac passes through the cervix and usually ruptures, releasing water. • Udder enlarges in cows and ewes. • A hollow area appears in front of the hips at the end of Stage in I in cows and ewes.
Ewe	• Appetite reduced or suppressed • Restlessness • May paw the ground and bleat • May move with difficulty	1 day or more	
Sow	• Nervousness • Makes a nest in the bedding • Usually won't eat	2-10 hours	

☛ **NOTE:** The birth process is not totally predictable and opinions and research vary about specific times, duration, and types of assistance.

TABLE 2

STAGE II — DELIVERY OF THE NEWBORN					
Dam	**Duration of labor**	**Time between multiple births**	**Attempt to assist[1] after:**	**Basic assistance**	**Call vet:**
Cow	Heifers: 60-90 min Cows: 30-60 min	Up to 30 min	Heifers: 60-90 min Cows: 30-60 min	Using a plastic sleeve, palpate the calf for normal position, presentation, and posture. If the problem is simple, such as pulling a foot forward, correct it.	If the problem is too difficult or assistance fails; or 2 hours after the water sac breaks
Ewe	30-45 min	30-60 min	60 min	Palpate as for cows.	If the problem is too difficult or assistance fails; or 2 hours after the water sac breaks
Sow	30 min - 10 hr; avg is 1-4 hr	avg is 15 min; can be hours[2]	45-60 min	Inject 1-3 cc (depending on size) oxytocin (POP) at 15-30 min intervals Use your fingers to pull piglets out by the head or rear legs. Use a firm, steady pull. Use a snare around the head or legs, if necessary. Pull only as hard as one hand can pull. Separate piglets from sow, if necessary[3]	After 2 hours, if the sow shows serious difficulty giving birth, or oxytocin doesn't work and you can't get the piglet out.

[1] If assistance is required, the earlier you start, the more chance you have of delivering a live animal. Don't delay! Call a vet as soon as you know you can't identify a problem or can't correct it.

[2] The size of the litter has little or no effect on the delivery time. The mortality rate increases with the length of the delivery time.

[3] Some sows become hysterical and violent during farrowing. They may lie on piglets, bite them to death, or trample them. Remove piglets immediately and keep them from the sows until she calms down. Test her readiness to receive the piglets by putting piglets by her one at a time. A sow with temporary hysteria during farrowing should be culled.

TABLE 3

STAGE III — DELIVERY OF THE PLACENTA			
Dam	**Normal delivery time**	**Call vet to assist after**	**Comments**
Cow	8-12 hr	48 hr	• Stage III can take up to two weeks (three weeks for sows) for the uterus to return to normal size and for extra fluids, which may appear bloody, to be completely discharged. Mild, short straining is common. • Administer antibiotics if the placenta is retained. • Observe for discharge containing pus for two-three days after delivery. Continue to watch for a reddish discharge that increases in volume, has a foul smell, and/or contains pus. Call a vet if these conditions occur.
Ewe	up to 12 hr	12 hr	
Sow	After emptying of one horn or by 4 hr following delivery	4 hr	

OBJECTIVE 3

Required Activities/Resources
- Share personal experiences with dystocia.
- Discuss the similarities and differences in dystocia with calves, lambs, and pigs.

Optional Activities/Resources
- Video
- Additional activities in Instructor's Guide

Discuss dystocia.

(?) Start your discussion with the question, "How can dystocia affect my calf operation?" Although this section is about cattle, the principles of dystocia and the approach to assisting an animal with dystocia are essentially the same for all livestock. See objective 11 for swine dystocia.

WORDS YOU SHOULD KNOW	
Caesarean section	surgical removal of the fetus
adhesions	places where tissues grow together abnormally following an inflammation or injury
anestrus	the estrous cycle does not occur
estrous cycle	the patterns of hormone changes that occur between one estrus and the next
estrus	the period when a female will stand for breeding and is capable of conceiving

- **Causes of dystocia**
  - The fetus is too large or the pelvis is too small.
  - The calf is in the wrong position.
  - The cow experiences uterine fatigue (lack of contractions).
  - There are twins.
  - The calf or calves are fetal monsters.
- **The results of dystocia on the fetus**
  - The cow may die.
  - The fetus may die.
  - The fetus may have trauma, such as fractures.
  - The calf may have weak-calf syndrome.
- **Calves with acidosis**
  - don't breathe quickly enough
  - don't have a sufficiently rapid heartbeat
  - don't shake their heads
  - don't respond
  - don't shiver
  - can't nurse
- **Check for possible dystocia**
  - first-calf heifers: every 2 hours
  - cows: 2-4 times a day
- **How to recognize possible dystocia**
  - Look for animals that have isolated themselves.
  - Watch for signs that Stage II has started.
  - Time these events and keep a record.

- **Know your limitations**
  - Examine the cow.
  - Determine what needs to be done.
  - Determine whether you are able to do it.
  - Call a vet, if needed.
- **Things to check after a dystocia birth**
  - Look for another calf.
  - Check for vaginal tears.
  - Watch to see if the cow can get back up.
- **The hidden cost of dystocia:** The cow takes a longer time to return to estrus.
- **Prevent anestrus with regular veterinary check-ups.**
- **Management tools used to avoid dystocia**
  - nighttime feeding: cows fed in the late afternoon or early evening are more likely to deliver during daylight.
  - inducing labor
- **Reasons for inducing labor**
  - Assistance will be available.
  - overlong gestation period/before calf gets bigger
- **Guidelines for inducing labor**
  - Notify your vet that you want to induce labor.
  - Keep accurate records.
  - Confirm breeding date with early signs of labor.
  - Make sure the mother is ready. Check for signs that the milk has dropped.

- **Disadvantages of induced labor**
  - high possibility of a retained placenta
  - The calves may be weaker.
- **Hours from injection to delivery: 24-36**
- **Summary of how to approach dystocia**
  - Have the right equipment.
  - Assist at the proper time.
  - Call a vet if the problem is outside your experience or capabilities.

OBJECTIVE 4

Discuss chemicals and drugs needed to assist with the birthing process.

Required Activities/Resources
- Discuss safety when using drugs and chemicals.
- Display examples of the chemicals and drugs used in the birthing process.
- Teach or review the Information Sheet and Job Sheets 5, 6, and 7 from Unit C-3 "Vaccination and Drugs."
- Demonstrate how to use chemicals and administer drugs.

Optional Activities/Resources
- Review video.
- Practice giving injections on oranges.

WORDS YOU SHOULD KNOW	
antibiotic	a substance that inhibits or destroys specific microorganisms EXAMPLES: penicillin, streptomycin ☞ **NOTE:** A *broad-range antibiotic* is designed to control several different types of bacteria or other organisms.
obstetric	related to care during pregnancy, delivery, and the period immediately following delivery (abbreviated O.B.)

- **obstetrical soap** – a non-detergent soap used to wash the vulva and surrounding area and as a lubricant. If obstetrical soap isn't available, you can dissolve a very mild soap in warm water.
- **lubricant** – a sterile lubricant or mineral oil used to reduce friction and irritation when inserting a sleeved arm, chains, or other equipment into the birth canal and uterus

- **broad-range antibiotic** – an oral or injectable antibiotic used to prevent infection

  EXAMPLE: Oxytetracycline or chlortetracycline in 200-500 ml of physiological saline solution

- **antiseptic** – a non-irritating antiseptic such as tincture of iodine used to treat the navel cord after delivery

- **disinfectant** – used to kill bacteria on chains or other equipment before insertion

- **oxytocin** (POP) – a hormone injected to stimulate contractions

OBJECTIVE 5

Identify basic instruments needed to assist with calving difficulties.

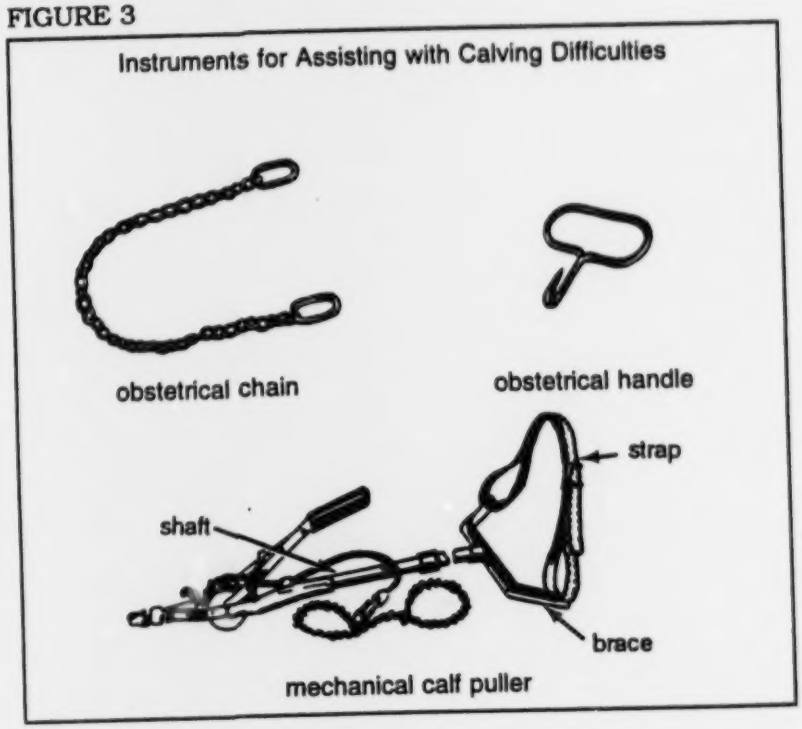
Required Activities/Resources
- Display instruments.
- Demonstrate how instruments are used.

Optional Activities/Resources
- Review video.

You will see the basic instruments used to assist with calving difficulties. You must be able to name each of these instruments. (Figure 3)

- **obstetrical handle** (Figure 3)

FIGURE 3

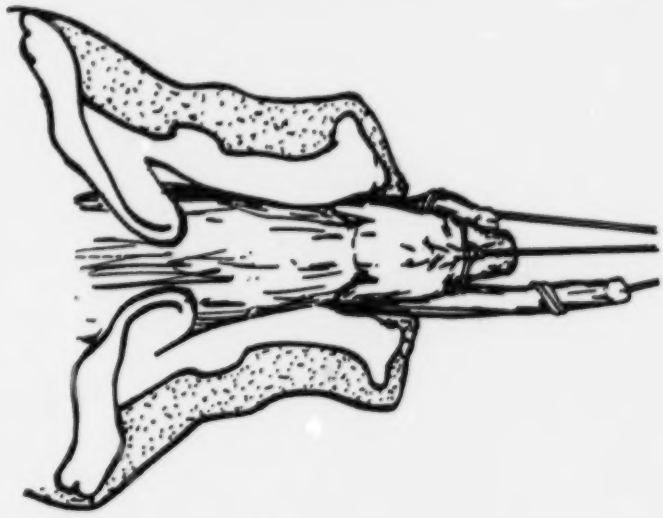


- **obstetrical chain or soft rope** – 60″ or two 30″ chains or lengths of soft rope (Figure 4)

  ☞ **NOTE:** The rope should be discarded after use unless it is plastic and can be sterilized.

FIGURE 4

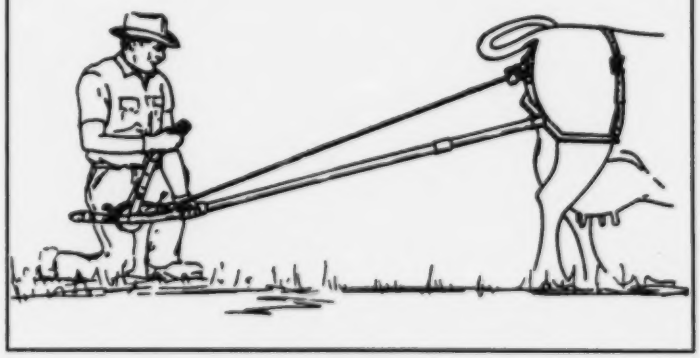
Using an obstetrical rope to pull a calf whose shoulders are too broad to pass through the pelvis



- **mechanical calf puller** (Figure 5)

FIGURE 5

Using a mechanical calf puller



OBJECTIVE 6

Describe how to perform a vaginal examination by hand. (Figure 6)

Required Activities/Resources
- Demonstrate and allow students to perform a vaginal examination on a cow, ewe, and/or sow.

Optional Activities/Resources
- Review video.

WORDS YOU SHOULD KNOW	
palpate	to examine by touching
presentation	direction the fetus is headed in the birth canal EXAMPLES: Anterior — head first; posterior — rear feet first; breech — rump first with the feet underneath
position	the direction of rotation EXAMPLES: Upright, on its side, upside down
posture	the way the head and limbs are presented and extended EXAMPLE: Normal posture in cattle is with the head and forelimbs extended into the birth canal.
zoonoses	diseases, such as rabies or brucellosis, that can be transmitted from animals to humans through normal contact

If problems arise, they generally show up after the water sac appears. Two hours of labor with no progress indicates that you should palpate the fetus.

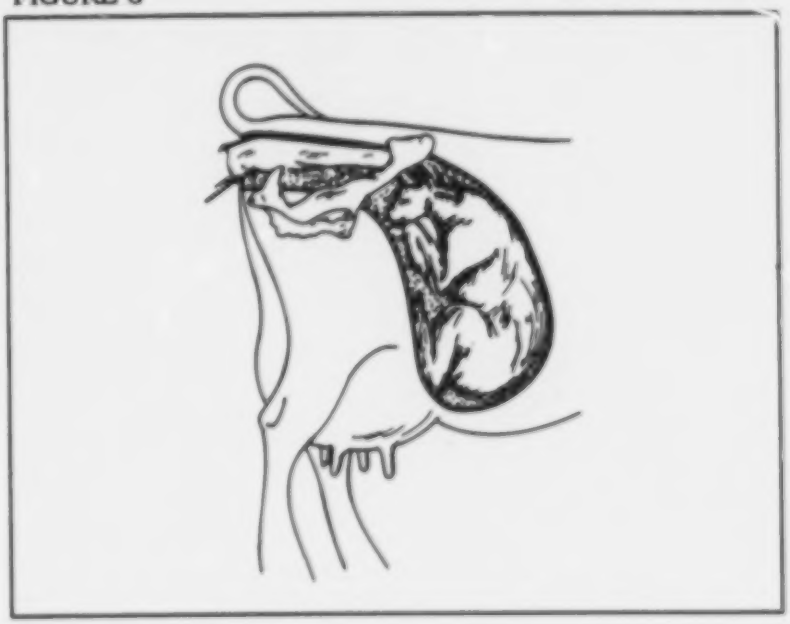
- **Preparation**
  - Thoroughly wash your hands, wrists and arms with soap and warm water.
  - Always wear a glove or sleeve to prevent the transmission of zoonoses.
  - Use a proper antiseptic to prevent transmission of disease or infection from you to the animal.
- **Check the cervical dilation.**

- **Check for signs of life.**
  - Pull or pinch the fetus's foot to cause movement.
  - Place your finger in its mouth to cause the sucking response.
  - Insert your finger into the rectum to cause constriction if fetus is in the breech position.
- **Check presentation, position, and posture.**
  - Feel and identify the parts that are in the birth canal. Be aware of a possible multiple birth and check that the body parts you identify belong to the same animal.
  - Locate both front legs and head, or both back legs if the fetus has a posterior presentation. Both legs should be in the canal and extended.
  - Check for extended or folded body parts. When possible, gently extend the leg or straighten the head, if needed.
- **Check for size.**
  - Feel the wrist, checking for abnormal size.

- Feel the head size and compare it to the diameter of the pelvis. (Figure 6)

  ☞ **NOTE:** If the forehead is hitting against the pelvis and the calf or lamb isn't coming out, the fetus is too big and will not deliver vaginally. Call a vet.

FIGURE 6



OBJECTIVE 7

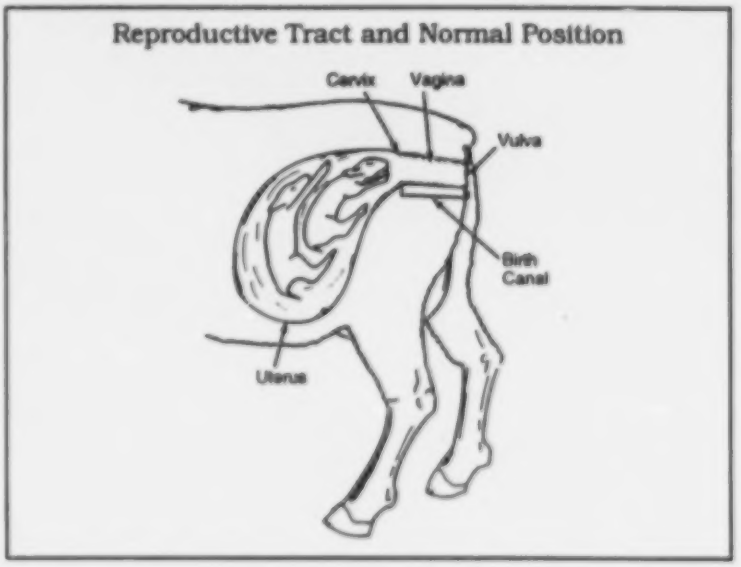
Select actions to take for various calving and lambing positions.

Required Activities/Resources
- Transparency Masters 1-9.

Optional Activities/Resources
- Review video.
- Talk with an experienced stock manager and/or a veterinarian about assistance for these conditions and others, such as twins.

You will see nine transparencies showing calving and lambing positions.

FIGURE 7



- **normal** – Both front legs are outstretched in the birth canal with the head and neck extended between or along the legs is normal for calves and lambs. A lamb's nose should be about level with its knees (Figure 7). This this the anterior presentation and is the most common (Figure 8). Posterior position, with rear legs extended, is also normal for sheep and common in calves (Figure 9).

  - **Assistance:** None required unless there is a delay in delivery. A delay may cause the lamb or calf to drown when the umbilical cord separates. Any delay requires assistance.

FIGURE 8

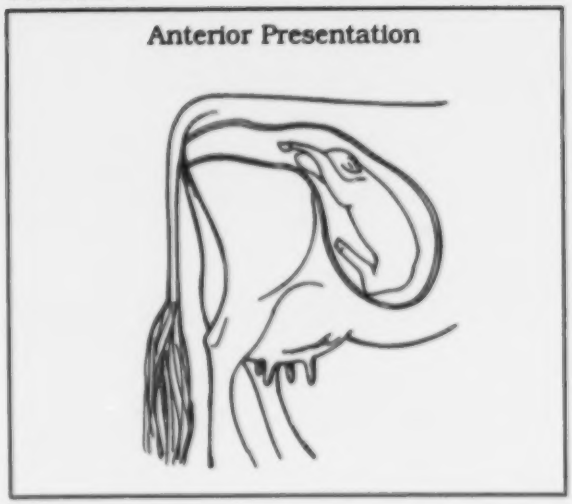
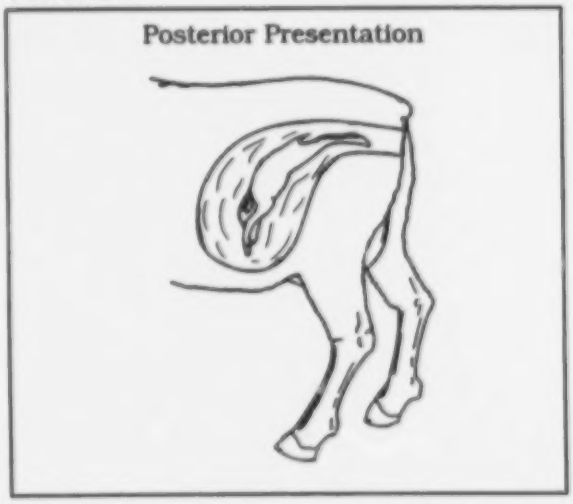


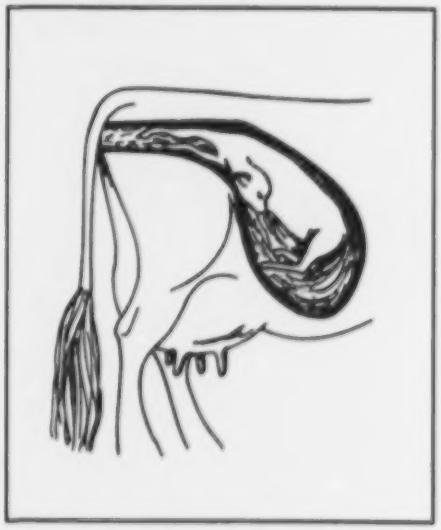
FIGURE 9



- **head back** – The feet are forward, but the head is facing backward or downward (Figure 10)

  - **Assistance:** Push the calf or lamb back and quickly release it in order to grasp its nose with your hand. Pull the head and neck around in line with the birth canal. If this doesn't work, you may use an obstetrical chain on calves or a soft rope on lambs. Place the chain around the poll, under the ears, and through the mouth. Don't let the open jaws of the fetus cut the birth canal.

FIGURE 10

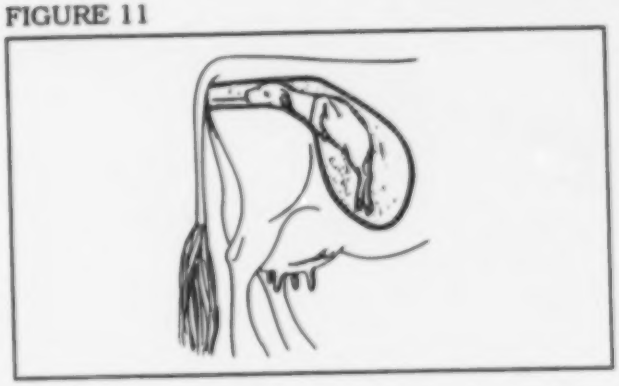


☞ **NOTE:** When you are repositioning the fetus in the uterus, cup the hoof in your hand so the hoof won't cut the uterus wall.

- **leg back** – One leg is forward, one is folded backward (Figure 11)

  - **Assistance:** Push the calf or lamb back by the head and hold the folded foot in your palm. Turn it up as much as possible, then pull your hand forward so that the leg straightens as you bring your hand out. In extreme cases, you should use an obstetrical chain on cattle and a soft rope on lambs.

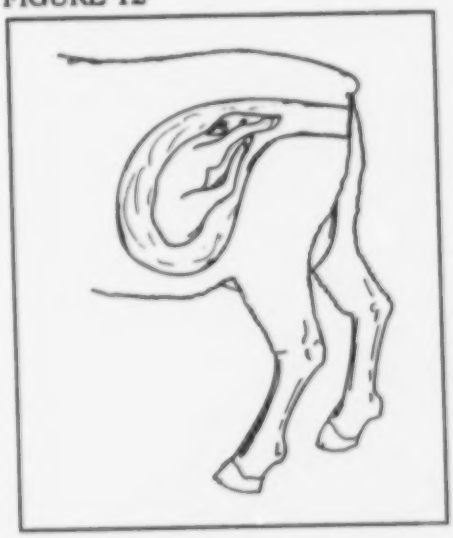
FIGURE 11



- **dog-sitting position** – Rear legs are forward (Figure 12)

  - **Assistance:** Call a vet. The rear legs must be pushed back before delivery, usually a job for a professional.

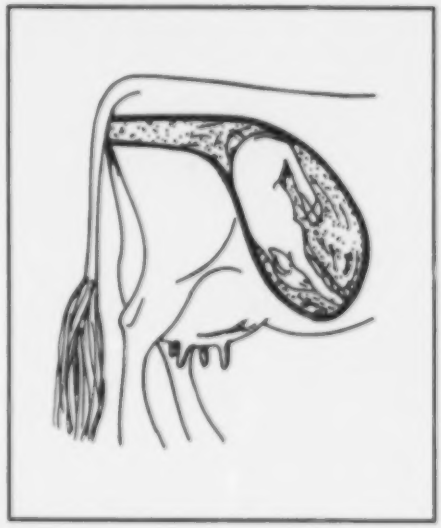
FIGURE 12



- **upside down and backward** – Calf or lamb has rotated from the normal position because the uterus has twisted. (Figure 13)

    - **Assistance:** Call a vet. Never try to pull a calf or lamb in this position.

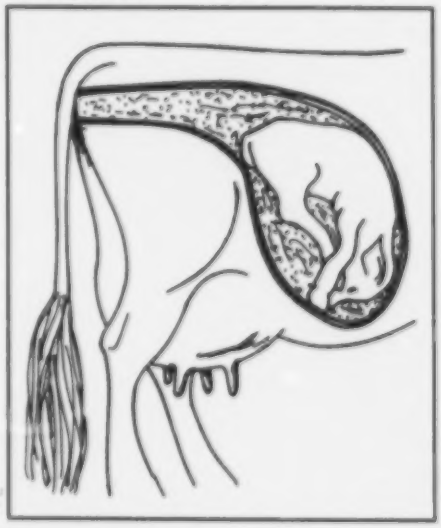
FIGURE 13



- **breech** – Calf or lamb is presenting with the rear forward and the legs tucked under. (Figure 14)

    - **Assistance:** Place the obstetrical chains on one rear leg at a time. Push the calf forward and then pull the leg into the birth canal.

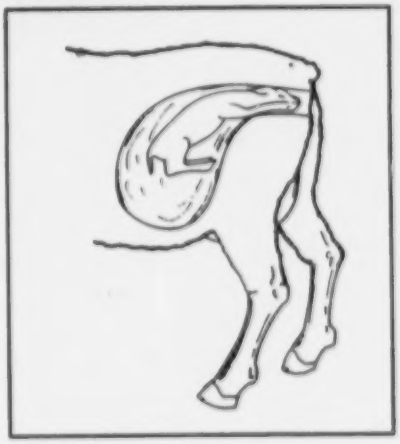
FIGURE 14



- **elbow lock** – The lamb's elbows are slightly bent and lodge against the brim of the pelvis. The nose and tips of the hooves are at the same distance from the vulva. Elbow lock is a common delivery problem in sheep. (Figure 15)

    - **Assistance:** Push the head and one foreleg back slightly into the ewe. Let go and quickly grasp the other foreleg, pulling gently to straighten the elbow. Repeat, pulling on the other foreleg. Then pull both legs at the same time until the lamb is delivered.

FIGURE 15



OBJECTIVE 8 **Complete Job Sheet 1.**

OBJECTIVE 9 **Complete Job Sheet 2.**

OBJECTIVE 10

Select normal birth averages for swine.

Optional Activities/Resources
- Refer to gestation information in Unit B-1.

WORDS YOU SHOULD KNOW	
farrowing	term used for parturition in swine
mortality	death rate
viability	able to live and develop outside the uterus

☑ **NOTE:** See Objective 6 for averages in duration of labor, interval between pigs, and delivery of the afterbirth.

- **gestation** – ranges from 112-117 days, averages 114 days
- **litter size** – ranges from 1-20, averages 8-9 pigs
- **birth presentation** – approximately 50-70% are born head first, 24-25% are born breech
- **mortality** – the death rate increases as the farrowing progresses. The last pig delivered from each uterine horn has only a 50/50 chance of viability

OBJECTIVE 11

Discuss farrowing difficulties and the appropriate assistance.

Optional Activities/Resources
- Video
- Additional activities in Instructor's Guide

DYSTOCIA

☑ **NOTE:** Torsion of the uterus, developmental abnormalities of the fetus, prolapse of the vagina, poor physical condition of the sow, and other factors can cause dystocia that may require professional assistance. Any time you give assistance, be sure you are working in clean, sanitary conditions. Use plastic gloves and disinfectants to prevent infection and the transmission of disease to the animal or to yourself.

- **uterine inertia** – common condition in which the womb has not contracted fully
  - **action** – Check for a blockage in the birth canal. If there is no blockage and more than 30 minutes elapse between pigs, give 1-3 cc (depending on size) of POP.

- **malpresentation** – *Transverse presentation*, in which the fetus lies across the body of the uterus, may require assistance. Malpresentation because of the legs is rare because pigs' legs are very short. Both head-first and feet-first deliveries are normal for pigs. However, the feet can get stuck.

  - **action** – Perform a digital (finger and hand) examination. If you can identify the problem and correct it, do so. If not, call a vet.

    ☛ **NOTE:** Piglets can bite while they are still in the dam. Keep your fingers out of and away from the mouth when turning or handling a fetus.

- **small maternal pelvis or overly large fetus** – Small litters tend to produce large individual pigs.

  - **action** – Call a vet.

- **fractures or injuries to the pelvis**

  - **action** – Call a vet.

OTHER FARROWING PROBLEMS

- **prolonged gestation** – sow carries a litter longer than 117 days

  - **action** – Check the sow twice daily. Look for any vaginal discharge that might indicate a problem.

- **foul vaginal discharge** – One or all of the pigs may be dead.

  - **action** – Call a vet.

- **hysteria** – sow becomes so excited she can't concentrate her energy for the birth process

  - **action** – Call the vet to administer a sedative and cull the sow after the pigs are weaned.

- **distress or exhaustion** – sow is out of breath or hot to the touch from heat

  - **action** – Give the sow plenty of ventilation, sponge her down with cool water, consult a vet, and inject POP.

OBJECTIVE 12

Complete Job Sheet 3.

OBJECTIVE 13

Discuss care of the newborn calf, lamb, and piglet.

Required Activities/Resources
- Discuss similarities and differences in the care of each species.
- Demonstrate how to stimulate breathing, clear away mucous and membranes, and resuscitate an animal.

Optional Activities/Resources
- Review video.
- Read and respond to either "Swine Farrowing Units" and "Swine Nursery Units" from the *Pork Industry Handbook* or OSU Fact Sheet, "Environmentally Controlled Farrowing and Nursery Housing".
- Design a farrowing unit.
- Read and respond to selected portions of *Sheep Health and Management.*
- Discuss the basic needs such as warmth, contact with other animals, and attachment to the mother that affect the emotional health of an animal as well as its physical health.
- Additional activities in Instructor's Guide

WORDS YOU SHOULD KNOW	
antibodies	proteins in the blood that protect against specific diseases

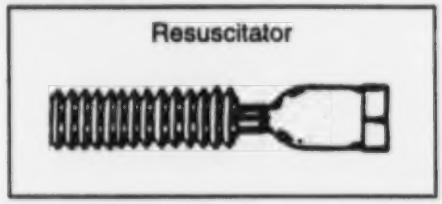
ALL NEWBORNS

- All newborns must breathe and have a respiratory rate fast enough to create a good oxygen-carbon dioxide balance.

  If the newborn has trouble breathing:

  - Stimulate breathing.
    - Tickle the nostrils.
    - Vigorously rub the sides of calves and lambs; rub a pig's chest.
  - Normally the dam will clean away the mucous. If she doesn't, remove all mucous and membranes from the nose and mouth.
  - If breathing passages are blocked, hold the animal upside down (you can lay a lamb or calf across the dam's back with it's head hanging down) or swing the animal back and forth upside down to release the mucous.
  - Try to resuscitate animals that appear to be dead.
    - Use a resuscitation bag or pump. (Figure 16)

FIGURE 16



    - Resuscitate pigs by forcing air into the lungs with a funnel. Put the big end over pig's mouth, and blow into small end.

- Newborns must nurse within 12-24 hours of birth to get the colostrum needed to protect them against disease. The colostrum contains antibodies that are transferred to the

newborn. After 24 hours, the antibodies are no longer present and the newborn will not develop the immunity necessary for survival and health.

If the newborn doesn't nurse within a short time after birth:

- Place it at the teat.
- You may have to bottle-feed it with commercially prepared colostrum or inject the colostrum into its stomach with a stomach tube (also called an esophageal feeder).

  ☞ **NOTE:** Always keep frozen colostrum available.

- If the dam is sick, weak, dead, or won't accept the newborn, place it with another nursing mother, if possible.

- Protect against infection at the navel. Dip, pour, or swab the area with a 7% solution of tincture of iodine.

- You can tag or mark for identification within a few days after birth.

- You can administer antibiotics or nutritional supplements. Follow within hours or days after birth, depending on the label instructions for correct dose and schedule.

LAMBS

☞ **NOTE:** Starvation and pneumonia are the two major causes of lamb deaths.

- Dry and warm a weak newborn immediately, even before feeding.

- If the ewe doesn't claim the lamb, you can try one or more of these procedures:
  - Tie the ewe in her pen until she will let the lamb nurse.
  - Put a dog near the pen containing the ewe and lamb.
  - Rub some of the ewe's milk on her nose and on the lamb.
  - Spray a strong-smelling salve or a household deodorizer on the ewe's nose and on the lamb.
  - Blindfold the ewe.

PIGLETS

- Clip the needle teeth.
- Notch the ears.
- Dock the tails.

  ☞ **NOTE:** Tail docking is used by commercial swine producers to prevent tail biting.

- Give the piglets a shot of iron.

OBJECTIVE 14

Complete Job Sheet 4.

JOB SHEET 1

BIRTH ASSISTANCE B-5

Name _____

OBJECTIVE 8

Assist a cow in calving.

Optional Activities/ Resources
– Review procedure on video

☞ **NOTE:** Use this procedure if a cow or heifer labors too long.

EQUIPMENT AND SUPPLIES

- cow or heifer calving
- obstetrical chains
- obstetrical handles
- mechanical calf pullers
- obstetrical soap
- broad-range antibiotic
- injection supplies (antiseptic, syringes, cotton swabs)
- iodine bolus or other antibiotic
- 5% or 7% tincture of iodine
- disinfectant
- lubricant such as mineral oil
- means of restraint if necessary
- plastic gloves
- clean knife

☞ **NOTE:** All equipment should be sterile.

PROCEDURE

Check the position of the fetus.

	Yes	No
1. Gently restrain the animal if necessary.	____	____
2. Scrub your hands and arms thoroughly with obstetrical soap.	____	____
3. Clean the anal and vulva areas: Remove any manure or other matter and wash the area with obstetrical soap.	____	____
4. Put on gloves.	____	____

Life Science
- Investigate/apply principles of anatomy/physiology
- Investigate health issues

Job Acquisition/ Development
- Master specific job task/procedure
- Practice good work habits/attitudes

	Yes	No
5. Lubricate the gloves with mineral oil.	____	____
6. Hold the tail to one side and insert your hand very slowly and gently, palm side down.	____	____
7. Check the calving position of the fetus.	____	____
8. Correct the calving position to the normal position if possible (front feet should be extended toward the birth canal with hoof pads facing downward and the head lying on top of the front feet), or call a vet if professional assistance is needed.	____	____

WARNING: IF A VET IS NEEDED, DO NOT CONTINUE WITH THIS JOB SHEET. Call a vet *immediately* if you can't identify the problem or can't correct it. Without professional assistance both the cow and the calf could die.

PROCEDURE

Assist birth using obstetrical chains and calf pullers.

9. Lubricate vaginal walls and fetus liberally.	____	____
☞ **NOTE:** An ounce of lubrication is worth a ton of pressure.		
10. Make a loop in one end of the obstetrical chain by placing the small links through the large link at one end of the chain.	____	____
11. Place the loop on one foreleg above the calf's dewclaw, make another loop below, and pull the loops snugly.	____	____
12. Make a loop on the other end of the obstetrical chain and place it on the other foreleg as in step 11.	____	____
13. Place the mechanical calf pullers on the lower portion of the hindquarters with the strap over the top of the rump; adjust the strap so the butt plate sits below the vagina.	____	____
14. Hook the obstetrical chain onto the cable of the calf pullers.	____	____

	Yes	No
15. Take up the slack on the cable and chain.	____	____
16. Examine the calving position, making sure the fetus is still in a normal position.	____	____
17. Pull down on the mechanical calf pullers towards the cow's legs. Exert pressure ONLY when the animal strains and relax when she relaxes.	____	____

WARNING: EXCESSIVE OR IMPROPER PRESSURE AND PULLING STRAIGHT OUT CAN DAMAGE THE DAM. PULL AT A DOWNWARD ANGLE, NOT STRAIGHT OUT. If vaginal tears, uterine rupture, paralysis or uterine prolapse occur, you should call a vet immediately.

18. Apply pressure slowly and firmly with the calf pullers.	____	____
19. Continue applying downward pressure when the cow strains and relaxing when she relaxes until the calf has delivered.	____	____

WARNING: IF THERE IS NO PROGRESS, CONSULT A VET. An extreme amount of pressure on the pelvis can fracture the pelvis or damage the nerves, causing paralysis of the hindquarters.

20. Cut or break the umbilical cord if it is not already separated.	____	____
21. Check the calf's breathing. If the calf has trouble breathing:	____	____
a. Remove the mucous from the nose and mouth.	____	____
b. If the calf still can't breathe freely, swing it back and forth to dislodge mucous.	____	____
22. Treat the calf's navel cord with tincture of iodine.	____	____

	Yes	No
23. Vaccinate the cow with a broad-range antibiotic according to label directions.	____	____
☞ **NOTE:** See Unit C-4 for vaccination procedures.		
24. Check the cow for retained placenta and paralysis 48 hours after delivery.	____	____
☞ **NOTE:** If the placenta is retained, give an antibiotic bolus or other antibiotic according to the label directions. If temporary paralysis occurs, the cow may need assistance to get on her feet. Sometimes she may need assistance for several days or weeks. Other cases may result in permanent paralysis.		
25. Have your instructor check your work.	____	____
26. Clean, sterilize, and put away tools and materials and clean up the work area.	____	____

SKILL TEST RECORD

EVALUATOR'S COMMENTS

_____

_____

_____

PRODUCT EVALUATION

Evaluator note: Rate the student on the following criteria by circling the appropriate numbers. Each criterion must receive a rating of "3" or higher to demonstrate student mastery. (See the Key below.) A student who is unable to demonstrate mastery should review the material and submit another product for evaluation.

Criteria:				
Assisted cow with delivery	4	3	2	1
Maintained clean, antiseptic conditions and equipment	4	3	2	1
Used good judgment in assessing whether to get professional help	4	3	2	1
Successfully positioned calf	4	3	2	1
Maintained observation and care until cow and calf were stabilized	4	3	2	1

AVERAGE RATING

Evaluator note: To obtain an average rating for the Competency Profile, total the designated points in Product Evaluation and divide by the total number of criteria. Circle the rating on the Key.

KEY

4 **Skilled** – Can perform job with no additional training.
3 **Moderately Skilled** – Has performed job during training program; limited additional training may be required.
2 **Limited Skill** – Has performed job during training program; additional training is required to develop skill.
1 **Unskilled** – Is familiar with process, but is unable to perform job.

EVALUATOR'S COMMENTS

JOB SHEET 2

BIRTH ASSISTANCE

B-5

Name _____

OBJECTIVE 9

Assist a ewe in lambing.

EQUIPMENT AND SUPPLIES

- lambing ewe
- sheep shearing clippers
- lambing pen
- 5% or 7% tincture of iodine
- obstetrical soap
- warm water
- lubricant such as mineral oil (optional)
- broad-range antibiotic
- injection supplies (antiseptic, syringes, cotton swabs)
- plastic sleeves
- clean knife

PROCEDURE

Life Science
- Investigate/apply principles of anatomy/physiology
- Investigate health issues

Job Acquisition/ Development
- Master specific job task/procedure
- Practice good work habits/attitudes

	Yes	No
1. Tag the lamb by shearing wool from around the udder, flank, and dock.	____	____
2. Place the ewe in the lambing pen two or three days before lambing.	____	____
3. Check for signs of labor.	____	____
4. Check labor progress when it begins, but do not disturb the ewe unless she has labored for some time and shows no signs of progress.	____	____
5. Scrub your hands and arms thoroughly with warm water and obstetrical soap and put on the sleeve.	____	____
6. Wash the ewe's vulva with warm water and obstetrical soap.	____	____

	Yes	No
7. Check to see that the lamb is in the proper position by inserting your hand into the vulva.	___	___
☞ **NOTE:** Ewes often have multiple births, so put one lamb in position to be delivered first.		
8. Correct position(s) for normal delivery.	___	___

⚠ **WARNING:** IF THE FETAL POSITION IS ABNORMAL AND YOU CAN'T CORRECT IT WITH SIMPLE ASSISTANCE, CALL A VET. Failure to call a vet in time can result in injury or death to the lambs and/or the ewe.

9. Lubricate the vaginal walls and fetus using obstetrical soap or other lubricant.	___	___
10. Check the lambing position.	___	___
11. Pull each of the lamb's forelegs alternately outward and downward as the ewe strains.	___	___
12. Continue pulling until the lamb is born.	___	___
☞ **NOTE:** If parturition is normal, allow the ewe time to deliver. If abnormal, relubricate the sleeve and assist. If another fetus is present, check its position and pull on its forelegs until it is born, relubricating as needed.		
13. Cut or break the umbilical cord if it has not broken off.	___	___
14. Check the lamb's breathing. If the lamb has difficulty breathing:	___	___
a. Remove the mucous from the nose and mouth.	___	___
b. If it still can't breathe freely, swing it back and forth to dislodge the mucous.	___	___
15. Treat the umbilical cord with tincture of iodine.	___	___

		Yes	No
16.	Give the ewe a vaccination of a broad-range antibiotic according to the label directions.	____	____
	☛ **NOTE:** See Unit C-3 for vaccination procedures.		
17.	Check the ewe for retained placenta and paralysis 12 hours after delivery.	____	____
18.	Have your instructor check your work.	____	____
19.	Clean, sterilize, and put away tools and materials and clean up the work area.	____	____

SKILL TEST RECORD

EVALUATOR'S COMMENTS

_____

_____

_____

PRODUCT EVALUATION

Evaluator note: Rate the student on the following criteria by circling the appropriate numbers. Each criterion must receive a rating of "3" or higher to demonstrate student mastery. (See the Key below.) A student who is unable to demonstrate mastery should review the material and submit another product for evaluation.

Criteria:

Assisted ewe with delivery	4	3	2	1
Maintained clean, antiseptic conditions and equipment	4	3	2	1
Used good judgment in assessing whether to get professional help	4	3	2	1

Successfully positioned lamb(s)	4	3	2	1
Maintained observation and care until ewe and lamb(s) stabilized	4	3	2	1

AVERAGE RATING

Evaluator note: To obtain an average rating for the Competency Profile, total the designated points in Product Evaluation and divide by the total number of criteria. Circle the rating on the Key.

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EVALUATOR'S COMMENTS

JOB SHEET 3	*BIRTH ASSISTANCE*	**B-5**

Name _____

OBJECTIVE 12

Farrow a sow.

EQUIPMENT AND SUPPLIES

- farrowing sow
- farrowing facility (disinfected)
- 5% or 7% tincture of iodine
- towels
- obstetrical soap
- warm water
- disinfectant (such as 1 lb of household lye mixed with 20 gallons of hot water)
- oxytocin
- injection supplies (antiseptic, syringes, cotton swabs)
- string
- scissors or knife
- clean, soft cloths or cotton swabs
- broad-range antibiotic

PROCEDURE

Life Science
- Investigate/apply principles of anatomy/physiology
- Investigate health issues

	Yes	No
1. Disinfect the farrowing facilities three or four days before farrowing.	____	____
2. Wash the sow with soap and water three or four days before farrowing and place her in the farrowing pen.	____	____
3. Cut the sow's ration in half for three or four days before farrowing.	____	____

☞ **NOTE:** The sow should have access to clean water at all times.

Job Acquisition/ Development
- Master specific job task/procedure
- Practice good work habits/attitudes

	Yes	No
4. Check for birth of a pig every 15 minutes after labor begins.	____	____
☞ **NOTE:** If more than 30 minutes elapses between piglets, or if the sow has labored for 2½ hours and shows no signs of progress, then you should perform a vaginal examination. If there are no obstructions and the piglet is in the normal position, then the sow may have uterine inertia. Give 1-3 cc (depending on size) of oxytocin intramuscularly or subcutaneously every 15-30 minutes as needed. If the sow doesn't respond after two injections, call a vet. See Unit C-4 for injection procedures.		
5. Pull the umbilical cord out of the sow gently when the piglet is born, if it doesn't break off by itself.	____	____
6. Remove mucous from the pig's mouth.	____	____
7. Dry the pig off with a clean towel as soon as the mucous is removed.	____	____
8. If a pig is born not breathing, stimulate breathing by vigorously rubbing its chest.	____	____
9. Tie off the umbilical cord with string about an inch from the body.	____	____
10. Cut off the remainder of the umbilical cord with scissors or knife.	____	____
11. Swab the pig's umbilical cord and surrounding area with tincture of iodine, or dip the cord in the iodine.	____	____
12. Check the sow for retained placenta 12 hours after delivery.	____	____
13. Give the sow an injection of a broad-range antibiotic according to label directions.	____	____
14. Have your instructor check your work.	____	____

	Yes	No
15. Clean, sterilize, and put away tools and materials and clean up the work area.	____	____

SKILL TEST RECORD

EVALUATOR'S COMMENTS

_____

_____

_____

PRODUCT EVALUATION

Evaluator note: Rate the student on the following criteria by circling the appropriate numbers. Each criterion must receive a rating of "3" or higher to demonstrate student mastery. (See Key below.) A student who is unable to demonstrate mastery should review the material and submit another product for evaluation.

Criteria:

Assisted sow with delivery	4	3	2	1
Maintained clean, antiseptic conditions and equipment	4	3	2	1
Delivered oxytocin in good time	4	3	2	1
Maintained observation and care until sow and pigs were stabilized	4	3	2	1

AVERAGE RATING

Evaluator note: To obtain an average rating for the Competency Profile, total the points in Product Evaluation and divide by the total number of criteria. Circle the rating on the Key.

KEY

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EVALUATOR'S COMMENTS

_____

_____

_____

JOB SHEET 4

BIRTH ASSISTANCE

B-5

Name _____

OBJECTIVE 14

Clip the newborn piglets' needle teeth.

EQUIPMENT AND SUPPLIES

- Side-cutter pliers
- Litter of piglets

PROCEDURE

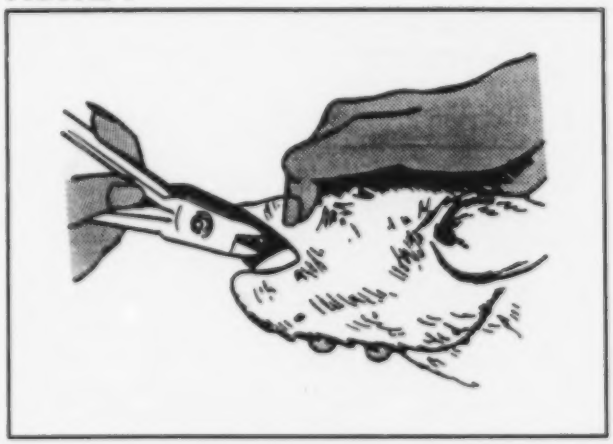
	Yes	No
1. Hold the pig's head in one hand and the clippers in the other.	____	____
2. Use the side-cutter pliers to clip the needle teeth, making a clean cut with no jagged edges. (Figure 1)	____	____

Life Science
- Investigate/apply principles of anatomy/physiology
- Investigate health issues

Job Acquisition/ Development
- Master specific job task/procedure
- Practice good work habits/attitudes

CAUTION: DO NOT PULL OR BREAK OFF THE TOOTH BELOW THE GUMS. This area can become infected.

FIGURE 1



	Yes	No
3. Put the piglet down and repeat the procedure with its litter mates.	____	____
4. Have your instructor check your work.	____	____
5. Clean and put away tools and clean the work area.	____	____

SKILL TEST RECORD

EVALUATOR'S COMMENTS

_____

_____

_____

PRODUCT EVALUATION

Evaluator note: Rate the student on the following criteria by circling the appropriate numbers. Each criterion must receive a rating of "3" or higher to demonstrate student mastery. (See the Key below.) A student who is unable to demonstrate mastery should review the material and submit another product for evaluation.

Criteria:

Made clean cuts	4	3	2	1
Clipped teeth to appropriate length	4	3	2	1
Handled piglets appropriately	4	3	2	1

AVERAGE RATING

Evaluator note: To obtain an average rating for the Competency Profile, total the designated points in Product Evaluation and divide by the total number of criteria. Circle the rating on the Key.

KEY

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EVALUATOR'S COMMENTS

_____

_____

_____

OBJECTIVE SHEET

BIOTECHNOLOGY: EMBRYO TRANSFER AND GENE SPLICING

B-6

INTRODUCTION

Biotechnology is a science on the cutting edge of technology. Biotechnology can be defined as the use of living organisms to produce, modify, or improve products. The majority of breakthroughs in biotechnology have happened from the late 1970s to the present. Biotechnology offers many exciting opportunities as well as concerns in the field of agriculture. Increased or improved production of animal products and prevention of animal disease are two applications of biotechnology to animal science.

PREREQUISITE

None

FOCUS ASSIGNMENTS

Reading Comprehension
- Gain factual information
- Analyze cause and effect
- Draw conclusions

Language
- Use standard grammar, spelling, and capitalization
- State ideas clearly

Composition
- Use complete sentences

FOCUS ASSIGNMENTS	
PREREADING:	Read the handout *Designer Mice, Increased Milk, Identical Herds: What Is Going On Here?*
WRITING:	Write a short (one paragraph to one page) discussion of the handout. Include your opinions of how the developments may affect consumers, producers, and the fields of agriculture and animal science.

UNIT OBJECTIVE

After completing this unit, you will show the following competencies by mastering the activities on the Assignment Sheets and by scoring at least 85% on the Written Test.

SPECIFIC OBJECTIVES

1. Choose the word or phrase to complete statements about genetic engineering.
2. Discuss moral and ethical issues associated with genetic engineering.
3. Discuss embryo transfer.
4. Describe the transfer process.
5. Discuss gene mapping and gene splicing.
6. Select situations in which gene splicing can be used.
7. Discuss cloning technology.
8. Choose the word or phrase to complete statements about computer applications in animal science.
9. Write opinion statements on concerns in animal genetic engineering. (Assignment Sheet 1)
10. Give a presentation on a recent development in genetic engineering or other new technology. (Assignment Sheet 2)

INFORMATION SHEET

BIOTECHNOLOGY: EMBRYO TRANSFER AND GENE SPLICING

B-6

OBJECTIVE 1

Choose the word or phrase to complete statements about genetic engineering.

Required Activities/ Resources
- Discussion

Optional Activities/ Resources
- Read pamphlets on biotechnology
- Watch a video on biotechnology
- Write a paper on the history of biotechnology

Discuss the question "What is genetic engineering?"

WORDS YOU SHOULD KNOW	
biotechnology	the use of living organisms to produce, modify, or improve products
clone	genetically identical organisms
gene mapping	determining the exact locations of genes on a chromosome
gene splicing	removing a specified gene from its position on a chromosome and replacing it with another gene; gene splicing is also referred to as recombinant DNA technology
recombinant DNA	the DNA formed by combining DNA segments from two or more different types of organisms
transgenic	description of an individual developed through genetic engineering or gene transfer

- Genetic engineering is a technology that is complex and involves removing, modifying, or adding genes to a DNA molecule.
- Genetic engineering involves or may be referred to as:
  - gene cloning
  - gene transfer
  - gene splicing
  - recombinant DNA technology

- Purposes of genetic engineering in animal science include:
  - increasing milk, meat, egg, or fiber production

    EXAMPLE: The genetically-engineered hormone bovine somatotropin (BST) is being used to increase the milk production of dairy cows.

  - improving quality and composition of animal food products

    EXAMPLE: The hormone porcine somatotropin (PST) improves feed efficiency in hogs and also decreases fat, providing leaner cuts of pork.

  - preventing and controlling animal disease

    EXAMPLE: Genetic engineering is used to produce interferons and interleukin-2 which are natural proteins that fight viruses. Research is being done on using interferons or interleukin-2 to prevent shipping fever in cattle.

  - producing new products through genetic alteration of animals

    EXAMPLE: Transgenic sheep can secrete human blood factor IX in their milk. This factor is essential for proper blood clotting and is needed by people with bleeding disorders.

  - improving human health

    EXAMPLE: Scientists are using genetic engineering to develop laboratory animals that will help in the development of new vaccines and treatment for cancer and AIDS.

  - decreasing animal use

    ☞ **NOTE:** The use of animals in research and product testing has raised ethical concerns. Genetic engineering may by used to decrease the number of animals needed for research.

- Although humans have been selectively breeding animals for many years, the "era" of genetic engineering began in 1977 when the gene for the human hormone, somatostatin, was synthesized in a lab and spliced into a bacterial cell.

- Genetic engineering is a *controversial* technology involving moral and ethical questions. There are people who *support* genetic engineering and those who *oppose* genetic engineering.

OBJECTIVE 2

Discuss moral and ethical issues associated with genetic engineering.

Required Activities/ Resources
- Discussion

Optional Activities/ Resources
- Read publications on legal issues
- Find current magazine or newspaper articles

Discuss the question "What are some moral and ethical issues associated with genetic engineering?"

WORDS YOU SHOULD KNOW	
ethical	following a set of standards which are based on principles or values held by a certain group of individuals
moral	accepted or established principles of what is right and wrong

- Genetic engineering provides benefits to animals and humans.
- There are also concerns about the use of genetic engineering. Concerns include such items as:
  - release of organisms that could harm the environment
  - development of resistant organisms that become difficult to control in the environment
  - loss of large genetic base (pool) by removing genes through genetic alteration
  - genetic alteration that may cause deformities or death
  - environmental impact of genetic engineering
  - consumer safety concerns

    EXAMPLE: Some consumer groups oppose bovine somatotropin because of the concerns about the safety of the milk consumers drink.

- Genetic engineering raises *ethical* questions such as:
  - Is genetic engineering a legitimate science, or are we "playing God?"
  - Will genetic engineering help relieve hunger and poverty, or will it help only the rich?
  - Is this technology useful for countries that do not raise enough food to feed themselves?
  - Will genetic engineering cause more environmental problems, or will it help relieve them?
  - Will the focus of genetic engineering research be toward commercial profitability or for improvement of animal and human welfare? Can it be both?
  - Will genetic engineering be controlled by large entities or through public representation?
  - Is regulation sufficient to prevent disastrous problems from arising?
  - Will genetic engineering narrow gene pools and reduce genetic diversity?
  - Should we adopt high production technologies in the face of surplus commodities?
  - Is recombining genes to develop a "super" animal legitimate?
  - Is somatic cell (not passed on to the next generation) gene manipulation acceptable for animals?
  - Is gamete cell gene manipulation acceptable for animals?

☞ **NOTE:** Products involving genetic engineering are regulated by various federal agencies including the Food and Drug Administration (FDA), U.S. Department of Agriculture (USDA), and the Environmental Protection Agency (EPA). Laboratory research involving genetic engineering follows guidelines established by the National Institutes of Health (NIH). Individual states may have further regulations concerning genetic engineering.

OBJECTIVE 3

Discuss embryo transfer.

Optional Activities/ Resources in Instructor's Guide

WORDS YOU SHOULD KNOW	
embryo transfer	placing an embryo of a donor into the reproductive tract of a recipient
flushing	using a special solution to remove the embryos from the reproductive tract of the donor
superovulation	the release of multiple eggs at a single estrus

- Embryo transfer has become an established technology in the cattle industry. Commercial embryo transfers in the United States were first done in the early 1970s.

- Embryo transfer in cattle involves the flushing of embryos from the reproductive tract of donor cows and implanting them in recipient cows. Donor cows possess many desirable genetic traits; recipient cows carry the embryos and must have certain characteristics such as good health.

- This technology makes it possible to produce a greater number of offspring from desirable cows than if the cows were required to carry each embryo to full term. The embryos which are transplanted carry the donor cow's desirable genetic traits while being carried to term in lower quality recipient cows.

- Other benefits of embryo transfer include:

  - more rapid genetic improvement in a herd
  - the ability to prove the productivity of dams and sires sooner due to the greater number of offspring over a shorter time span
  - prolonging the productive life of a female that for reasons such as injury cannot carry offspring full term
  - the ability to import or export desirable genetic traits with embryos in cases where importing or exporting is not practical

- Advancements or current research in embryo transfer include:
  - **one-step freezing process** – a method of freezing and thawing embryos in a straw container; this process allows recipient cows to be bred in a procedure similar to artificial insemination
  - **embryo splitting** – embryos are split to produce two or more identical calves from one embryo
  - **embryo sexing** – embryos of known sex are implanted into recipient cows

OBJECTIVE 4

Describe the transfer process.

Optional Activities/ Resources
- Read OSU Fact Sheet No. 3158
- Listen to a guest speaker

The steps in the embryo transfer process are outlined below.

1. Selection of the donor cow.
   - The donor cow is selected for a variety of reasons including the potential dollar value of her calves.
   - The donor cow should have a normal reproductive tract and have no conformational or detectable genetic defects.
2. Superovulation of the donor cow.
   - The donor cow is induced to produce multiple eggs during a single estrus. This is usually accomplished by giving hormone injections of FSH (follicle stimulating hormone) and prostaglandin.
3. Insemination of the donor cow.
   - High quality semen with a large percentage of normal, motile cells is important. Donor cows may be inseminated more than once to increase the chances of fertilization.
4. Flushing of the embryos
   - The embryos are collected non-surgically by inserting a synthetic rubber catheter through the cervix of the donor cow and flushing a special medium into and out of the uterus to collect the embryos seven or eight days after estrus.
   - This process is relatively simple and can be accomplished in approximately 30 minutes without harm to the cow.

5. Evaluation of the embryos

   - Embryos are evaluated for their likelihood of success if transplanted to a recipient female.

6. Selection and preparation of the recipient cow

   - Recipient cows must be carefully selected. Recipient prospects should be in good health, exhibit calving ease, and have good milking and mothering abilities.

   - Estrus synchronization between the donor cow and recipient cow must be done.

7. Transfer of the embryo

   - Embryos are transferred into recipient cows.

   - Embryos may be transferred immediately upon recovery and evaluation, or they may be stored frozen in liquid nitrogen and transferred at a later date.

☞ **NOTE:** The above steps are condensed from the OSU Fact Sheet No. 3158 *Embryo Transfer in Cattle.*

OBJECTIVE 5

Optional Activities/ Resources in Instructor's Guide

Discuss gene mapping and gene splicing.

WORDS YOU SHOULD KNOW	
ligase (lig-ăse)	enzyme used to join pieces of DNA
plasmid	a small (usually circular) piece of DNA that is separate from the chromosomal DNA
restriction enzyme	enzyme that cuts DNA strands at specific sites
vector	an agent such as a plasmid used to transfer DNA into a host cell

- Gene mapping is the process of determining the locations of genes on a chromosome.

  - Both plant and animal cells are composed of millions of genes which are located on many different chromosomes.

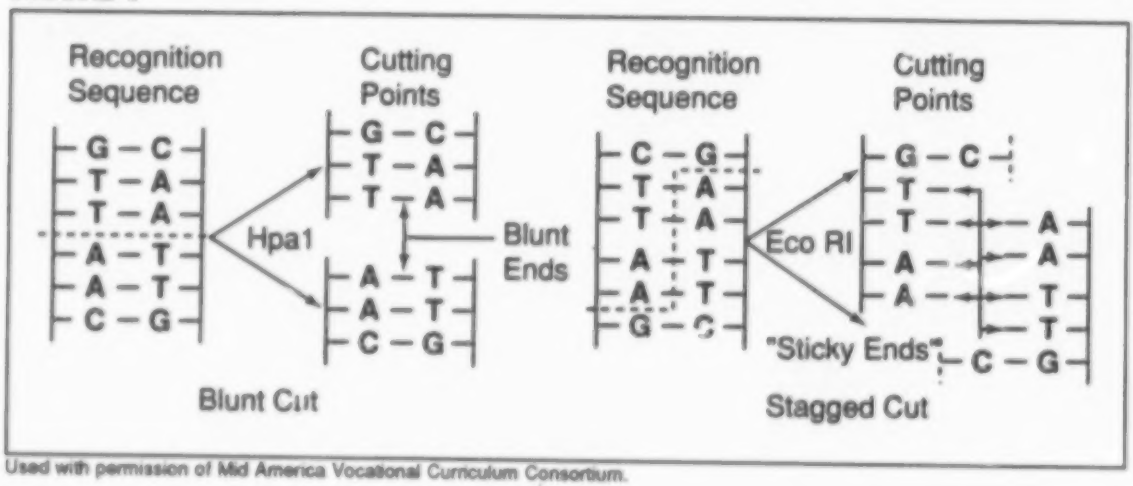
  - The location of only a few genes is known.

- To modify the gene code, the exact location of a gene must be known.
- After the location of a gene is determined, a restriction enzyme capable of splicing a specific gene out of a chromosome must be found.

- Gene splicing is the process of removing a specified gene from its position on a chromosome and replacing it with another gene.
  - When removing genes from a chromosome, chromosome ends where the splicing occurred remain sticky.
  - Using a ligase, desirable genes are placed close to the modified chromosome and become attached where the undesirable gene was removed. Because of the ligase, the new gene permanently bonds on the chromosome.

- The steps in gene splicing are outlined below.
  1. Locate the desired gene (gene mapping).
  2. Isolate and remove the desired gene from all others in the nucleus.
     - Use restriction enzymes.
     - These enzymes cut the DNA molecule at a specific site to remove the nucleotide sequence that contains the desired gene. Figure 1 shows the recognition sequence and cutting DNA by restriction enzymes.

FIGURE 1



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3. Transfer the piece of excised DNA to a vector (commonly a plasmid in a bacterial cell).
    - Use the same restriction enzymes to open the plasmid ring.
    - Insert the DNA pieces excised.
    - The new gene can attach to the open ends of the plasmid.
    - Ligase may be needed to close the plasmid ring.
4. Transfer the plasmid DNA into the cell by transformation.
5. Replicate the plasmid inside a bacterial cell.
    - This will produce many copies of the plasmid containing the new genetic material.
    - New genetic information is included in each new generation of cells.
6. Observe for genetic expression.
    - Desired trait must appear in the target organism.
    - If the new trait appears, the organism is "transformed" - has a new genetic function.
7. Cultivate the transformed organisms so a new product or process can be used.

OBJECTIVE 6

Optional Activities/ Resources
- Research specific examples of gene splicing

Select situations in which gene splicing can be used.

- To produce more meat, milk, eggs, or fiber
- To produce higher quality meat, milk, eggs, or fiber
- To produce animal models for use in research
- To produce therapeutic agents for human use
- To prevent and control animal disease

OBJECTIVE 7

Discuss cloning technology.

Optional Activities/ Resources in Instructor's Guide

WORDS YOU SHOULD KNOW	
callus	a cluster of undifferentiated plant cells that can be induced to form the entire plant
tissue culture	in vitro growth of cells in nutrient medium

- Cloning is a process in which genetically identical individuals are produced.
- Cloning plants can be accomplished by stimulating cell division of a single plant cell to produce a complete plant.
  - The cells must be treated and then are callus.
  - By using the procedure of tissue culture, a new plant is eventually generated.
- It is possible to clone animal genes and create synthetic genes, but cloning mammals using procedures similar to plant cloning has not been successful.
- The cloning of mammals involves manipulation of the embryos.
  - Embryo splitting is a form of cloning, since two or more identical individual animals can be produced.

OBJECTIVE 8

Choose the word or phrase to complete statements about computer applications in animal science.

Required Activities/ Resources
– Discussion

Optional Activities/ Resources
– Write a paper on computers
– Find examples of specific software or computer applications

(?) Discuss the question "What are some computer applications in animal science?"

- Business management and marketing applications
  - Computer networks enable individuals to have access to many types of information and services.
    - market prices and information including farm commodities

- educational information
- electronic mail

- Computers allow for record keeping and decision making.
  - software programs for financial accounting systems

    NOTE: Successful businesses keep accurate, up-to-date, and easily available records. Good record keeping allows business owners to better evaluate their financial situation and make sound business decisions.

  - Software programs can aid agricultural business owners in determining when products should be sold.

    EXAMPLE: If the storage costs of a commodity are high, determining if it is better to sell the commodity at a lower price.

  - software programs to aid in management of inventory

    EXAMPLE: Agricultural businesses often have a great deal of equipment and must keep records of the equipment and record such items as depreciation.

  - software programs to aid in tax management

- Production management applications
  - computerized record keeping systems for livestock management
    - health and/or production records

      EXAMPLE: Milk production of dairy cattle

    - breeding records and parturition records

      EXAMPLE: The sire of a calf

    - balancing rations for livestock
    - management of crops
    - machinery uses of computer applications

      EXAMPLE: Computer displays on tractors record information such as maintenance.

- Research applications
  - record keeping of research projects
  - computer simulation
  - statistical interpretation of research data

OBJECTIVE 9 **Complete Assignment Sheet 1.**

OBJECTIVE 10 **Complete Assignment Sheet 2.**

ASSIGNMENT SHEET 1	*BIOTECHNOLOGY: EMBRYO TRANSFER AND GENE SPLICING*	**B-6**

Name _____ Score _____

OBJECTIVE 9

Write opinion statements on concerns in animal genetic engineering.

INSTRUCTIONS

Select two of the following questions about concerns in animal genetic engineering and write a statement that presents your opinion. Explain why you have that opinion. Be prepared to defend your opinion during class discussion or debate.

Language
- Use standard grammar, spelling, and capitalization
- State ideas clearly

Composition
- Use complete sentences

Life Science
- Investigate/apply principles of genetics/heredity

Concerns in Animal Genetic Engineering

1. Do we have the right to change the basic genetic makeup of animals?
2. Should we try to increase animal production when we already have a surplus of many commodities?
3. What effect will more efficient production have on depressed markets?
4. Who will benefit from animal genetic engineering - the large scale producer or the family farm?
5. Do we have the right to patent a living organism?
6. What will the quality of life be for transgenic animals?
7. How will the competitive position of the United States in world markets be affected if we do not participate in animal genetic engineering?
8. What effect will animal genetic engineering have on the purebred industry?

ASSIGNMENT SHEET 2	*BIOTECHNOLOGY: EMBRYO TRANSFER AND GENE SPLICING*	**B-6**

Name _____ Score _____

OBJECTIVE 10

Give a presentation on a recent development in genetic engineering or other new technology.

INSTRUCTIONS

- Select a topic on a recent development in genetic engineering or other new technology related to animal science. Refer to current scientific and agricultural journals for ideas.
- Research your topic using textbooks, library resources, magazines, or other sources.
- Write a 1-2 page summary of the development.
- Give a short oral presentation (3-5 minutes) on your topic. You may use note cards when giving your presentation. You may also use visual aids such as charts when giving your presentation. Remember to use proper speaking techniques.
- Ask your instructor for any other specific requirements of this assignment.

Research and Reference
- Select useful resources
- Locate resources
- Use magazines and newspapers

Language
- Use standard grammar, spelling, and capitalization
- State ideas clearly

Composition
- Use complete sentences
- Compose reports

Research
- Use note cards

Life Science
- Investigate/apply principles of genetics/heredity

Oral Presentation
- Make informative presentations
- Use good speaking techniques

Animal Science

Student Workbook

Part 2

Developed by the
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OBJECTIVE SHEET

ANIMAL HEALTH CARE

C-1

INTRODUCTION

Livestock diseases cost money. They take time from other activities and can endanger you, your family, and your other livestock. It makes good sense (and cents) to do everything you can to protect your livestock operation and encourage healthy, productive stock. The smartest and most effective approach is to develop a routine program of animal health care. Develop a written health plan for your stock that includes activities for health care, disease prevention, and pest control. Then follow that plan, adapting it as your situation requires. Ask for more information when you need it from your Extension agent, your veterinarian, your neighbors, and your vocational agriculture instructor.

Because productivity is the desired goal of all livestock operations, and productivity depends on health, animal health care should be a top priority.

PREREQUISITE

None

FOCUS ASSIGNMENTS

Reading Comprehension
- Gain factual information
- Analyze cause and effect
- Draw conclusions

Language
- Use standard grammar, spelling, and capitalization
- State ideas clearly

Composition
- Use complete sentences

FOCUS ASSIGNMENTS	
PREREADING:	Read Handout 1, "Animal Welfare, Animal Rights, and You."
WRITING:	Write a short essay (a paragraph to a page) about the ways in which this controversy might affect you.

UNIT OBJECTIVE

After completing this unit, you will show the following competencies by mastering the activities on the Assignment and Job Sheets and by scoring at least 85% on the Written Test.

SPECIFIC OBJECTIVES

1. Discuss animal health care.
2. List signs of a healthy animal.
3. List signs of an unhealthy animal.
4. Match livestock to their normal ranges of temperature, pulse rate, and breathing rate.
5. Take an animal's temperature. (Job Sheet 1)
6. Check an animal for signs of good health. (Job Sheet 2)
7. Discuss good management practices for maintaining animal health.
8. Discuss factors to consider when developing a health plan.
9. Adapt an animal health care plan to your individual needs. (Assignment Sheet)
10. Select true statements about ventilation.
11. Choose the word or phrase to complete statements about the use of disinfectants.
12. Match disinfectants to their uses and descriptions.
13. Choose the word or phrase to complete statements about caring for sick or injured animals.
14. Collect fresh urine and fecal samples. (Job Sheet 3)
15. Discuss considerations for treating wounds.
16. Treat wounds. (Job Sheet 4)
17. Discuss major shelter requirements of livestock.
18. Select handling characteristics for cattle, swine, and sheep.
19. Identify restraints for cattle, sheep, swine, and poultry.
20. Select true statements about chemical restraints.

21. Use flank casting and castration restraint on cattle. (Job Sheet 5)

22. Use vaccination or castration restraint on small pigs. (Job Sheet 6)

23. Use castration and docking restraint on small sheep. (Job Sheet 7)

INFORMATION SHEET

ANIMAL HEALTH CARE C-1

OBJECTIVE 1

Required Activities/ Resources
- Review objectives in Unit A-1.

Optional Activities/ Resources
- Talk with a veterinarian and/or a livestock owner/manager about the health care plan and how vets and managers work together.
- Share personal examples of successful and unsuccessful health care practices.
- Discuss animal welfare and animal rights.

Discuss animal health care.

Review Unit A-1, "Safety," objectives 4, 5, 6, 8, 10, and 11.

According to Dr. Michael W. Fox, veterinarian and Director of the Institute for the Study of Animal Problems in Washington, D. C., animal health is more than just feed, water, shelter, and freedom from disease. He says that when the stock manager pays greater attention "to the animal's physiological, emotional, and behavioral well-being, the animal will be healthier and more productive." Discuss the ways in which this statement might apply to cattle, sheep, swine, and poultry operations.

WORDS YOU SHOULD KNOW	
disease	any condition that results in a departure from normal function
immunity	having resistance to disease
infectious	capable of being transmitted to another organism with or without contact; transmitted by a microscopic organism

The high cost of animal disease

- Parasites and disease rob our animal production industry of billions of dollars and enormous numbers of animals. Despite the best feeds, housing, medicines, veterinary services, and research in history, we are still seeing major losses:
  - The percentages of bred animals that failed to give birth are: cows 12%, ewes 5%, sows 15%
  - Losses due to disease cost cow-calf operators $26.95 per cow in 1990.
  - Every year delayed breeding and sterility cost $60 per cow, or $650 million across the nation.
  - The percentages of young that die between birth and weaning are: calves 6%, lambs 20%, piglets 25%

- Poultry layer death runs about 10-12% per year, or 1% a month. Broiler losses are about 4%. Every year 8-9% of turkey poults and 5-6% of turkey breeder hens die from disease.

- hidden losses" occur through increased labor and costs accompanied by lowered profits from animals that have slow growth, slow maturity, low reproductive abilities, poor feed efficiency, carcass condemnations, and reduced meat quality.

- While many diseases are caused by infectious organisms such as bacteria and viruses, other important causes include heredity, nutrition, parasites, injuries, and environmental stress. Some of these causes can be associated with human behavior, human decisions, and human error.

Responsibilities of the owner/manager

- **Maintain high standards for your animals and operation.**

  - Protect animals from the elements (cold, heat, wind, sun).

  - Protect animals from diseases and parasites.

    ☛ **NOTE:** Diseases and parasites are covered in Unit C-2 and methods of administering vaccines and medications are covered in Unit C-4.

  - Provide healthful living conditions; develop a sound program of general cleanliness and sanitation.

  - Provide plenty of fresh water.

    ☛ **NOTE:** Some people say that plenty of pure water is the "cheapest way to keep an animal healthy."

  - Provide sufficient and suitable feed.

  - Treat animals with respect; do not abuse them physically or psychologically.

    ☛ **NOTE:** Handling animals early and gently and raising them in an environment without fear has been found to increase feed conversion efficiency (leading to more growth and faster maturation), to increase resistance to stress, and to enhance an animal's immunity.

- **Develop a health plan.**
  - A health plan is a schedule or calendar that includes standard livestock health care practices and those that are required for your individual operation. It is a guide, not a hard-and-fast rule book, to help insure that you perform all the necessary actions in good time to maximize your labor and economic investments in your stock.
  - A preventive health program is a cooperative effort between the stock manager and the veterinarian.
  - The health plan will include a schedule for
    - breeding
    - pregnancy testing
    - birthing preparation and procedures
    - worming, vaccination, and other preventive health medications
    - performing health-maintenance and production procedures such as regular physical examinations, castration, dehorning, docking, shearing, and animal identification (branding, tagging)
    - cleaning and disinfecting schedules
    - feeding and changing feed schedules
    - marketing
- **Work with your veterinarian.**
  - Keep accurate records about birth, vaccination, illness or injury, medication, feed, growth, productivity, etc.
  - Observe animals regularly, and know the signs of diseases and parasite infestations.
  - Observe a sick animal carefully and record symptoms in the order of occurrence.
  - Consult a vet when
    - you are planning and working with a preventive health program

- an animal is seriously injured
- an animal is having reproductive problems, such as failure to conceive, miscarriage, or difficult birth
- an animal dies and you don't know why; the vet should determine the cause of death
- an animal has symptoms of a contagious disease

- ☐ Call the vet *as early as possible* when a problem occurs. Early treatment can save money, save an animal's life, and make the vet's work easier.

  ☞ **NOTE:** Probably one of the most important questions in managing livestock is "Should I call the vet or should I handle this myself?" The answer will depend on your experience, knowledge, and training. In general, call the vet whenever you are not sure what the problem is or how to handle it.

- ☐ Know how to restrain a sick or injured animal and prepare for the vet's examination.

- ☐ Follow the vet's recommendations, including administering medications and performing treatment as directed.

OBJECTIVE 2

List signs of a healthy animal.

Required Activities/ Resources
- Compare signs of healthy and unhealthy animals (objective 3).

Optional Activities/ Resources
- Slides or videos
- Talk with a veterinarian or herd manager about signs of a healthy animal.

- contentment, can rest peacefully
- alertness
- aggressive appetite
- sleek hair and smooth, pliable skin
- bright eyes and moist, pink eye membranes
- normal feces and urine

☞ **NOTE:** Fecal consistency varies with the animal's diet. For instance, when animals are first turned out on lush grass, their feces will be loose. Consistency and dryness of the feces also vary among species, but should always be firm and not dry, and should not contain large amounts of undigested feed.

Urine should be clear. Both urine and feces should be passed without effort and should be free of blood, mucus, or pus.

- normal temperature, pulse rate, and breathing rate (see objective 4)
- alert, normal ear set

☞ **NOTE:** Alert ears are not a good indicator of health for the Brahman and Brahman crossbreeds because their ears are normally drooped.

OBJECTIVE 3

List signs of an unhealthy animal.

Optional Activities/ Resources
- Talk with a veterinarian or herd manager about signs of an unhealthy animal.
- Compare signs of an unhealthy animal to human health and behavior.
- Slides or videos of unhealthy animals

WORDS YOU SHOULD KNOW	
pulse	the expansion and contraction of an artery in accord with the heartbeat; can be felt with the fingers

- decreased food or water consumption; failure of young animals to nurse

☞ **NOTE:** The mother of a nursing animal should be checked routinely throughout the entire nursing period. If her teats are clean and sleek, the offspring has been nursing. If her udder is full, the offspring has not been nursing.

- listlessness
- dry nose
- abnormal feces or urine or difficulty in elimination
- abnormal discharge from the nose, mouth, or eyes
- unusual posture

  EXAMPLE: standing with head down, extreme nervousness
- persistent rubbing or licking
- dull hair and dry, scruffy skin
- inflammation or swelling under or on the skin

- loss of hair or feathers
- pale, red, or purple mucous membranes lining the eyes or gums
- unusual movements or reluctance to move

  EXAMPLE: limping, inability to walk or get up
- abnormal temperature, breathing, or pulse rate
- altered social behavior

  EXAMPLE: leaving the herd and going off alone
- sudden drop in production

  EXAMPLES: drop in work or weight gains; reduced milk, wool, or egg production
- ruminants not chewing their cuds

OBJECTIVE 4

Optional Activities/ Resources
- Compare normal rates and ranges to those of humans and other animals.
- Stress the importance of knowing the norms and recognizing any variation from them.
- Relate this knowledge to good record keeping.

Match livestock to their normal ranges of temperature, pulse rate, and breathing rate. (Table 1)

TABLE 1 Normal ranges of temperature, pulse rate, and breathing rate[1]

Animal	Rectal temperature in degrees Fahrenheit		Pulse rate per minute	Breathing rate per minute
	Average	Range[2]		
Cattle	101.5	100.4-102.8	60-70	10-30
Sheep	102.3	100.0-103.8	70-80	12-20
Swine	102.6	102.0-103.6	60-80	8-13
Poultry	106.0	105.0-107.0	200-400	15-36

[1] Young animals of a given species tend to have higher values within the range.

[2] While an animal's temperature can be an indicator of disease, other factors can also create abnormal temperatures. Exercise, hot weather, and consuming large quantities of high-energy feed can elevate the temperature. Body temperatures are lower at night and lower in older animals than younger animals.

OBJECTIVE 5

Complete Job Sheet 1.

OBJECTIVE 6

Complete Job Sheet 2.

OBJECTIVE 7

Discuss good management practices for maintaining animal health.

Required Activities/ Resources
- Discuss why each of the items listed is important for maintaining animal health.

Optional Activities/ Resources
- Visit facilities to observe management practices.
- Research how management practices protect human health, water systems, or other areas of concern.
- Read an OSU Extension Fact Sheet in a related area and present an oral report to the class.
- Look at examples of facility designs.
- Discuss the high rate of TGE spread during spring stock shows.

WORDS YOU SHOULD KNOW	
sanitation	identifying and taking steps that will maintain or restore healthful living conditions, such as removing sources of infestation or infection or preventing their occurrence

Biological agents and pharmaceuticals should not be relied upon as the sole basis of an animal health program. A good livestock producer can use the factors below to reduce the chances of introducing infectious diseases into a herd or flock.

- Purchase animals from reputable producers.
- Ask the producer for appropriate health papers and ask questions that might uncover health problems.

  EXAMPLES: Ask to see the production and reproductive records for the animal you are buying. Ask about the disease program being followed for the herd or flock, and ask to look at the entire herd or flock in addition to the animal you are buying.

- Isolate newly purchased animals in a separate pasture, lot, or barn for a minimum of three to four weeks before exposing them to your other livestock.
- Maintain a comprehensive sanitation program.
  - Use disinfectants.
  - Keep all areas clean.

- Provide good housing that has sufficient ventilation and drainage and can be thoroughly cleaned.

  ☞ **NOTE:** See objective 10 for more detailed information on ventilation.

- Barns and housing should be vacated for at least one month a year for thorough cleaning, disinfecting, and drying. If this is not possible you must clean and sanitize housing regularly, especially after one animal is removed and before another animal is placed in the same area.

- Remove manure from the areas where livestock live and feed.

- Control outside traffic, including vehicles and people. Keep shipping and receiving areas separate from the normal environments of your livestock.

- Provide coveralls and boots for outsiders entering your buildings, lots, and pastures. Have visitors step in disinfectant foot baths, spray their feet with disinfectant, or put on plastic shoe covers before entering livestock buildings.

- Control birds, rodents, and stray animals.

- Maintain adequate fencing. Use a double fence between your herd and a poorly managed neighboring herd.

- Dispose of dead animals promptly and properly. Bury or burn them, or hire a dead-animal disposal service.

- Establish a method of identifying animals that are sick or are being treated. Isolate these animals from the rest of the herd.

  EXAMPLES: ear tags, spray paint, chalk marks

- Plan the location of your buildings and lots to protect your operation from your neighbor's livestock drainage during wet periods.

- Rotate your pastures to control disease and parasites. Do not keep the same species in a permanent pasture. Rotate species in your pastures or use pasturage for crops.

OBJECTIVE 8

Required Activities/ Resources
- Relate factors to the health plan and other aspects of herd management.

Optional Activities/ Resources
- Examples of health plans and records

Discuss factors to consider when developing a health plan.

Your health plan should be written out in detail. You should have a calendar itemizing the procedures and the dates when they should be performed. To make the program practical, it should be coordinated with the routine handling of livestock.

- Keep a complete set of records on each animal. Keep records on animal numbers and birthdates; immunizations; breeding and reproductive information such as heats, breedings, births, sex, birthweights, and weaning weight of offspring; the history of the animal's illnesses and treatments.

  ☞ **NOTE:** Oklahoma State University issues a herd production calendar for keeping records for beef and sheep.

- Develop a closed herd of females as soon as possible. A closed herd helps eliminate problems associated with introduced reproductive diseases and failures. If outside females are brought in, they should be healthy, sound, virgin animals.

- Obtain semen-tested virgin sires from known healthy herds. Breeding soundness examinations and semen evaluations should be performed yearly on sires, preferably just before breeding season.

- Plan a preventive medicine schedule for all diseases and parasites for which protection is needed. The schedule should include dates for initial medication and boosters and their doses. Immunizations and surgical procedures of offspring should also be incorporated into the program.

- Institute and maintain a comprehensive sanitation program. Provide animals with clean, dry, well-ventilated housing. Use antiseptics and disinfectants; dispose of waste and dead animals properly.

- Conduct yearly physical examinations of brood stock. Examine eyes for diseases or growths, teeth for wear or breakage, feet for disease or damage and possible trimming or repair. Treat for internal and external parasites. Perform reproductive tract and pregnancy examinations.

OBJECTIVE 9

Complete the Assignment Sheet.

OBJECTIVE 10

Select true statements about ventilation.

Optional Activities/ Resources

- Experience examples of good and poor ventilation and report on their physical and psychological reactions.
- Discuss the relationship between humidity and air movement.
- Examine the ventilation system in your ag facility, in a greenhouse, and in a livestock barn or other structure.

WORDS YOU SHOULD KNOW	
pathogen	microscopic, disease-producing organism

- Poorly ventilated facilities have a high concentration of stale air and moisture, the perfect breeding ground for disease-producing organisms.
- Animals kept in a poorly ventilated space become stressed and less resistant to disease, especially to pneumonia and other respiratory diseases.
- Low concentration of oxygen in an area with poor air circulation and replacement can lead to poor animal health and bad tempers.
- Good ventilation prevents the buildup of unpleasant gases from decomposing urine and other sources, which can irritate mucous membranes.
- Ventilation is directly related to the amount of humidity in your facility. Good ventilation prevents the buildup of excess moisture in the air. In hot weather, high humidity can interfere with the animal's heat elimination processes, resulting in heat stroke.
- High humidity levels will also encourage the growth of pathogens and the transmission of contagious diseases among a herd or flock housed together.
- Ventilation is measured in cubic feet per minute (cfm).
- **Requirements of a good ventilation system**
  - It must provide enough fresh air to meet the respiratory needs of the livestock.
  - You must be able to control the buildup of moisture in the facility.
  - The system must move enough air to reduce the concentration of disease organisms to low levels.

- **Criteria for selecting a good ventilation system**

  ☞ **NOTE:** Your county extension agent can help you determine the proper ventilation system for your operation.

  - ☐ provides sufficient cfm of air for animals' needs, depending on species and size
  - ☐ building location and orientation (on a hill, in a valley; placed north-south or east-west)
  - ☐ outside temperature range
  - ☐ number and size of wall openings for the passage of air
  - ☐ type of insulation
  - ☐ number, size, and type of fans

OBJECTIVE 11

Required Activities/ Resources
- Study objectives 11 and 12 together.

Optional Activities/ Resources
- Stress the importance of knowing how to learn about disinfectants, which disinfectant to use, and how to use it correctly.
- Wash down several clearly developed forms of fungus with several types of disinfectants and observe the results.
- Perform an experiment in which you grow bacteria and test different types of disinfectants.

Choose the word or phrase to complete statements about the use of disinfectants.

WORDS YOU SHOULD KNOW	
antiseptics	chemicals that kill or prevent the growth of microorganisms with a minimum of damage to living tissues.
caustic	destructive to living tissue; capable of burning tissue
corrosive	destructive to nonorganic materials, such as metals, concrete, or plastic; capable of causing slow disintegration
disinfectant	a substance that destroys disease-producing bacteria or microbes or renders them harmless
germicidal	having the ability to destroy disease-producing organisms
microorganisms	an organism so small that it can't be seen without a microscope

- A population of animals of the same species or of different species living in the same environment produces the ideal circumstances for disease-producing germs (bacteria and viruses), fungi, and parasite eggs to breed and grow.

- These disease-producing organisms can affect generation after generation of animals if they are not controlled.

- Used properly, disinfectants are one of your strongest allies in fighting animal disease. The degree to which you keep your facilities clean and disinfected (disease-free) can usually predict the degree to which you are a successful livestock manager.

- Cleaning and disinfecting are NOT the same process. Disinfectants work effectively only after the facilities and equipment have been thoroughly cleaned, because organic matter protects the microorganisms and interferes with the germicidal action of the disinfectant.

- The "ideal" disinfectant for all circumstances doesn't exist. Your responsibility is to determine the best product for the job, considering the following:

  - ☐ the types of microorganisms you want to destroy

    ☑ **NOTE:** Most products will kill most disease-producing organisms; but some products are not effective against TB, tetanus, anthrax and other specific organisms.

  - ☐ the strengths and limitations of the disinfectant

    EXAMPLES: Chlorines will kill all types of bacteria, except TB organisms, but is also corrosive.

    Formaldehyde will kill anthrax and TB organisms, but is dangerous to use.

    Alcohol is a good noncaustic antiseptic for small areas, such as preparing the skin for an injection, but is too expensive to use for disinfecting facilities or equipment.

  - ☐ economy

- **Characteristics of a good disinfectant**
  - effective against a wide range of microorganisms
  - effective in a low concentration
  - economical to use
  - stays stable in storage and in the presence of manure, hair, dirt, and other organic matter
  - nontoxic to animals and humans, noncorrosive, and noncaustic
  - can be applied easily in ordinary conditions
  - can work effectively at low temperatures in a short period of time to penetrate organic matter and remove dirt and grease
- **Effective disinfection**
  - Thoroughly clean the area before disinfecting.
  - Mix the disinfectant in the proper concentration.
  - Use plenty of disinfectant.
  - Apply disinfectants that are most effective when hot while they are still hot.
  - Allow the chemicals plenty of time to destroy the microorganisms.
  - *Read the label, use the product only as indicated, and follow the manufacturer's instructions.*

OBJECTIVE 12

Match disinfectants to their uses and descriptions.

Required Activities/ Resources
- Consult a resource on types of disinfectants, their uses, concentrations, and limitations.

Optional Activities/ Resources
- Look at types of disinfectants.
- Stress the caustic and toxic characteristics of some disinfectants.
- Video

☑ **NOTE:** Check a resource such as *The Stockman's Handbook* or *Farmer's Digest* for additional information on uses, concentrations, limitations, and dangers of using these disinfectants. ALWAYS follow the directions on the label.

- **acetic acid and lactic acid** – used as preservatives for food and feed because they prohibit the growth of many microorganisms

- **alcohol** (ethanol, isopropanol) – used mainly as a skin disinfectant and in an emergency to disinfect instruments; not effective as an antimicrobial agent

  ☞ **NOTE:** Do not use alcohol to clean an injection site when using a modified live virus vaccine.

- **chlorhexidine** – used as a bath in which to soak instruments between their use on successive animals

- **chlorine** – used to sterilize water supplies, dairy equipment, dishes, and glassware; readily destroyed by organic material

- **cresols** – a general-use disinfectant, reliable, available in many commercial preparations

- **detergents, wetting agents, and emulsifiers** – used extensively because of their nontoxicity to living tissues

- **formaldehyde** – used to disinfect buildings after an outbreak of disease; destroys living tissue and can be highly poisonous

- **heat** – boiling items for ten minutes will usually destroy most disease germs, excluding anthrax and tetanus; steam and pressure is the most effective heat method; burning is a good method of disposing of infected body tissues

- **hydrogen peroxide** – oxidizing agent used for washing and cleansing wounds

- **iodine** – used very effectively on the skin; also makes an excellent wash in which to soak instruments between their use on successive animals

- **Lysol®** (creosol and soap) – used to disinfect equipment and skin for castrating and tattooing and other procedures and for disinfecting surgical instruments

- **orthophenylphenol** – odorless disinfectant frequently used around dairy barns; also effective against tubercular organisms

- **phenol** (carbolic acid) – considered one of the most efficient disinfectants, but too expensive and toxic for general use

- **potassium permanganate** – used with formaldehyde to fumigate buildings

- **quaternary ammonium compounds** (QAC) – used as an equipment rinse and spray disinfectant against non-spore-forming bacteria; fast-acting, good deodorizing agent

- **soaps** – used to remove oily compounds, organic matter, and bacteria from the skin; limited germicidal power

- **sodium hydroxide** (lye) – widely used as a germicide for milking equipment, and in stronger solutions used to kill the more resistant bacteria and viruses such as anthrax bacillus and hog cholera virus on floors, stalls, and pens

- **unslaked lime** – used with water to form calcium hydroxide, which is used as a whitewash on walls, floors, and certain types of equipment; also used to cover carcasses when burying them

OBJECTIVE 13

Choose the word or phrase to complete statements about caring for sick or injured animals.

Optional Activities/ Resources
- Obtain information on how to get first-aid training in your area.
- Discuss the importance of close observation and good record keeping.

WORDS YOU SHOULD KNOW	
zoonotic disease	a disease that can be transmitted from animals to humans through normal contact

- Learn first aid treatments for various types of injuries and diseases.

- Learn the proper way to administer commonly used medications.

  ☑ **NOTE:** See Unit C4, "Vaccination and Drugs."

- Follow your veterinarian's directions.

- Isolate the animal.

- Treat every disease as if it were a zoonotic disease.

- Avoid spreading an infectious disease or carrying bacteria to other animals and avoid contracting the disease yourself.

  - ☐ Take care of the animal after all other animals have been handled.

- Change clothes and either spray or dip your shoes in disinfectant before working with other animals.
- If the animal has an infectious disease, you should also take a shower after handling it.

- Make the animal comfortable.
  - Provide fresh water and food.

    ☞ **NOTE:** The animal probably will not eat as much as when it is healthy, but you should change it's food and water once or twice a day.
  - Keep the animal warm and out of drafts. Provide a heat source, if needed.
  - Provide clean bedding and change it often.
- Check vital signs several times a day: temperature, pulse, respiration rate.
- Observe the animal closely.
  - Check the stool for diarrhea.
  - Watch for open-mouth breathing that might indicate pneumonia.
- Prevent additional injury.

  EXAMPLE: Immobilize a leg or foot, if needed.

OBJECTIVE 14

Complete Job Sheet 3.

OBJECTIVE 15

Discuss considerations for treating wounds.

Optional Activities/ Resources
- Handout 2
- Additional examples of the examine-evaluate process
- Discuss the need to improvise in some circumstances.
- Talk with a veterinarian about what you can learn to do and when to call the vet.
- Visit a veterinary facility to observe animals being treated for injuries.

WORDS YOU SHOULD KNOW	
compression bandage	a pad of gauze or other material that puts direct pressure on the wound
debris	larger particles, such as hair, grass, gravel, pieces of skin or other material in the wound
sterile	free from germs (bacteria, fungus, or viral organisms)
topical	applied to specific area of the wound, such as a topical anesthetic or topical antibiotic
tourniquet	an object used on an extremity (leg, foot) to apply pressure to blood vessels and control bleeding
withdrawal period	the length of time in which a food additive or drug must not be administered to a meat animal prior to slaughter to insure there are no chemicals remaining in the tissues (residuals)
wound	injury in which the skin or any other body tissue is broken

- **Examine the wound**. Determine the extent of the injury and whether you have the skills and proper materials to treat the wound. You may have to clean the area to assess the type and amount of damage (see the section on how to clean the wound in this objective).
  - If the wound is large or deep, call a veterinarian *before* you attempt to treat it.
  - If a vein or an artery is cut, call the vet *first*, if possible, then attempt to control the bleeding. The vet will have to tie off the blood vessel or sew it back together to stop the bleeding.
    - If an artery is cut, the blood will be bright red and shoot out in spurts.

- If a vein is cut, the blood will be dark red and will flow in a steady stream.

- **Evaluate whether to treat or slaughter food animals.** With all injuries larger than a minor wound, determine how the injury will affect production.

  - Complete the evaluation *before* you start any treatment.

  - Animals sent to a packing company for slaughter will have to meet Federal Inspection Standards. If they are treated with medication, you must meet the withdrawal times before the animal can be slaughtered.

    EXAMPLE: If you give the animal penicillin and then decide to slaughter it, you will have a 21-day withdrawal period before you can slaughter. You will have to feed, house, and care for the animal during that three weeks.

  - Evaluation should take into consideration:

    - the cost of treating the injury
    - the probability of recovery
    - the value of the time out of service for treatment and recovery

      EXAMPLE: You have a 1500-pound bull worth $1,000 as a breeder and worth $750 as beef. If he has an injury that will keep him out of service for six or seven months (over the breeding season) and will cost $350 to treat, the smart decision is to slaughter him and buy another bull in time for breeding.

  - The animal should be slaughtered as soon as possible after the injury when any of the following occur:

    - The wound is severe.
    - The animal has a broken bone.
    - The animal has lost a large amount of skin (as from a burn).
    - Treatment and recovery exceed the meat value of the animal.

- **Treat minor wounds.**

  1. **Stop the bleeding.**

     - Your objective is to slow the bleeding to the point that a clot can form.

     - Mild pressure directly on the wound, such as a compression bandage, will usually stop bleeding.

       ☞ **NOTE:** The bandage forms a base where clotting can occur. With a compression bandage, once the bandage is soaked with blood, put more bandages on top of it, rather than removing and replacing it.

     - Tourniquets should be used only after compression has failed.

       ☞ **NOTE:** Check to see if the bleeding has stopped 12-15 minutes after applying a tourniquet. Never leave a tourniquet in place for more than 20 minutes. Remove it as soon as possible or the animal can get gangrene (death of the tissues due to lack of blood supply) below the tourniquet.

  2. **Clean the wound.** Use mild soap and water. Remove all dirt and debris from the wound area. You may have to cut away hair or wool to clean the wound.

     ☞ **NOTE:** Do not use electric clippers because they spread clippings over the wound.

  3. **Administer an antibiotic.** You can use a topical antibiotic cream, ointment, powder, or a solution such as 0.5% iodine; or you can use an injectable antibiotic as recommended on the label or by your vet.

  4. **Apply a dressing, if needed.** Cut away the hair and apply a sterile bandage. Most wounds don't require bandaging. A small gaping wound may heal properly if the skin is pulled together and then held in place with adhesive tape.

     ☞ **NOTE:** Do not attempt to bandage an area if you have not been instructed in how to wrap a wound. The bandage should apply even pressure to the entire area. The tissue around the wound will swell and if it is improperly bandaged, circulation can be cut off and the animal's condition will be much worse.

5. **Watch for signs of infection.** Check the wound often for redness, swelling, pus, or foul smell.

6. **Call a veterinarian if the wound becomes infected.**

OBJECTIVE 16

Complete Job Sheet 4.

OBJECTIVE 17

Discuss major shelter requirements of livestock.

Required Activities/ Resources
- Relate these requirements to one another, to animal health, and to finances.

Optional Activities/ Resources
- Compare differences in climate and how they affect shelter requirements.
- Research ways herd management has affected space requirements, such as breeding polled cattle or producing free-range chickens.
- Video

Appropriate and adequate shelter requirements should be met for proper management and maintenance of a healthy environment for various livestock. The considerations below should be of primary concern to serious livestock producers.

- **Proper environmental conditions**
  - Provide good ventilation to prevent disease.
  - Provide good ventilation to prevent a buildup of moisture. If there is too much moisture, the animals get wet and must go from a warm, wet environment into the outside cold. Moisture will also increase structural rotting and deterioration.
  - Maintain acceptable temperatures with good ventilation and proper insulation.
  - Provide an appropriate environment for newborn animals.
- **Select facilities with affordable design, construction, and maintenance costs.** The producer should meet the needs of the livestock, but should ask "Can the livestock enterprise using the building pay for it before it is worn out?" Often fancy or elaborate buildings are not sound investments. The producer should also be as flexible as possible in design, bearing in mind that the facility may have to be adapted or changed if the enterprise is changed.
- **Design your facilities for convenience.** Design your shelter space to keep labor to a minimum, allow easy cleaning and manure handling, and ease of maintaining sanitation.
- **Design your facilities for durability.** Structures should withstand wind strains or roof snow.
- **Locate the structures to promote dryness.** Place them so that rain water, animal urine, and cleaning water will drain away from the building.

- **Provide adequate lighting.** Maximize the use of natural light and provide adequate artificial light. If production cycles rely on day-length, provide a system to increase and decrease artificial day-length.

- **Create a safe environment.** Design your structure for your safety and for safe animal use of alleys and doors. Minimize the risk of fire with your choice of materials and storage areas.

- **Provide adequate space** for operators to work, for feed and bedding storage, for treating sick and injured animals, and for the species of animal sheltered. (Table 2)

TABLE 2 Space requirements for sheltering common species of farm animals

Species	**Requirements per animal**
Mature cattle (herd bulls and cows in maternity)	100-150 sq ft
Other cattle	30-50 sq ft
Mature sheep (stud rams and ewes with lambs)	20-30 sq ft
Feeder lambs	6 sq ft
Dry ewes	16 sq ft
Sows, gilts before farrowing, and herd boars	15-20 sq ft
Sows with pigs	45-60 sq ft
Growing finishing hogs	5-10 sq ft
Chickens (cages)	**depth width**
1 bird	16 in x 8 in
2 birds	16 in x 12 in
3 birds	16 in x 16 in
Chickens (floor space, depending on ventilation, flooring, and insulation)	1-4 sq ft
Turkeys	4-6 sq ft

- **Control rodents.** Keep rodents away from feed and bedding materials because of the possible spread of disease.

- **Locate your animal facilities close to related structures.** Structures should be located near suitable corrals, lots, pens, and so forth.

- **Make your structures attractive.** They should fit in well with the rest of the farmstead and be pleasant and acceptable to the humans living on the farmstead. Unsightly buildings have a negative psychological effect.

OBJECTIVE 18

Required Activities/ Resources
– Discuss similarities and differences in characteristics for different species.

Select handling characteristics for cattle, swine, and sheep.

☛ **NOTE:** Always treat animals with respect. Review Unit A-1 for additional information on handling animals.

Cattle

- Nervous, docile, or balking animals should be identified with ear tags, spray paint, chalk marks, or another method.
- Animals don't respond to argument or reasoning.
- Mature animals should not be restrained with ropes alone.
- Electric prods, whips, and dogs should be used sparingly.
- People, dogs, closed gates, panels, and similar objects cause cattle to turn.
- Strangers affect animal behavior.

Sheep

- Sheep are natural jumpers.
- They have a strong flocking instinct.
- People, dogs, closed gates, panels, and similar objects cause them to turn.

Swine

- Swine are stubborn and have definite ideas of their own.
- They are not athletic and can't stand very rough handling, especially in hot weather.
- Swine have poor eyesight and are easily frightened.
- They have an instinctive tendency to find a small opening and head for it, such as the space between your legs.
- Swine are difficult to catch because their bodies are very smooth and can slip through your hands.
- They are difficult to drive or pull because they usually want to go in the other direction.

- Offering feed is a good way to coax them.
- People, dogs, closed gates, panels, and similar objects cause them to turn.
- The slower you move with swine, the faster you get the job done.

OBJECTIVE 19

Identify restraints for cattle, sheep, swine, and poultry. (Table 3, Figures 1-32)

Optional Activities/ Resources
- Stress that learning how to use restraints and being confident in their use is critical to effective management.
- Review the uses and purposes of each of the restraints listed.
- Compare the restraints used for similar purposes but designed for different animals.
- Demonstration of the use of restraints
- Video

WORDS YOU SHOULD KNOW	
casting	throwing an animal
dominant hand	the hand habitually used first and with the greater natural responsiveness; on most people, the right hand is dominant
mechanical restraint	holding an animal with machinery
physical restraint	holding an animal with bodily force
preconditioning	exposing an animal early and often to handling or restraint so they are accustomed to it
restrain	to restrict an animal's actions or movement for the purpose of taming or gentling, leading the animal, or for foot trimming, surgery, or other operations

Restraints prevent injury to both the animal and the handler. The type of restraint used depends on the animal and the reason for the restraint. You should never restrain an animal longer than necessary. If you precondition an animal to handling and to the types of restraint used most often, handling will be easier for you and less stressful for the animal.

Learn these restraints well because you will be using them for many job sheets in this course.

TABLE 3 **Types of restraints for cattle, sheep, and swine.**

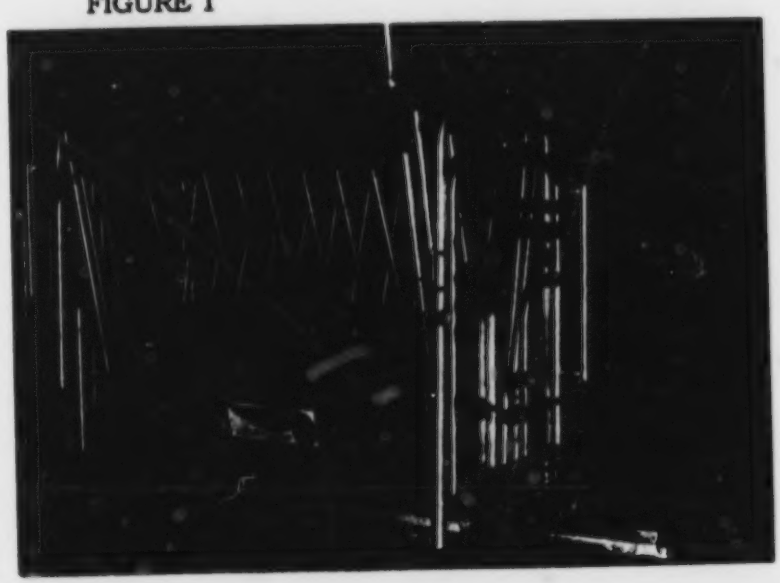
Cattle	Sheep	Swine
mechanical restraints • squeeze chute and headgate • cattle stock • tilting calf table • tilting table stock **physical restraints** • rope squeeze casting • castration restraint • calf castration tie **catching methods** • flank casting • rope	**mechanical restraints** • trimming stand • panels • chute • pregnancy table **physical restraint** • chin catch restraint • castration and docking restraint for small sheep • shearing stance • halter **catching methods** • flank catch • chin catch restraint	**mechanical restraints** • hog holder • snubbing rope • pig trap **physical restraints** • vaccination or castration restraint for small pigs • vaccination or castration restraint for large pigs **catching methods** • flank • heart girth

CATTLE

- **Mechanical restraints**

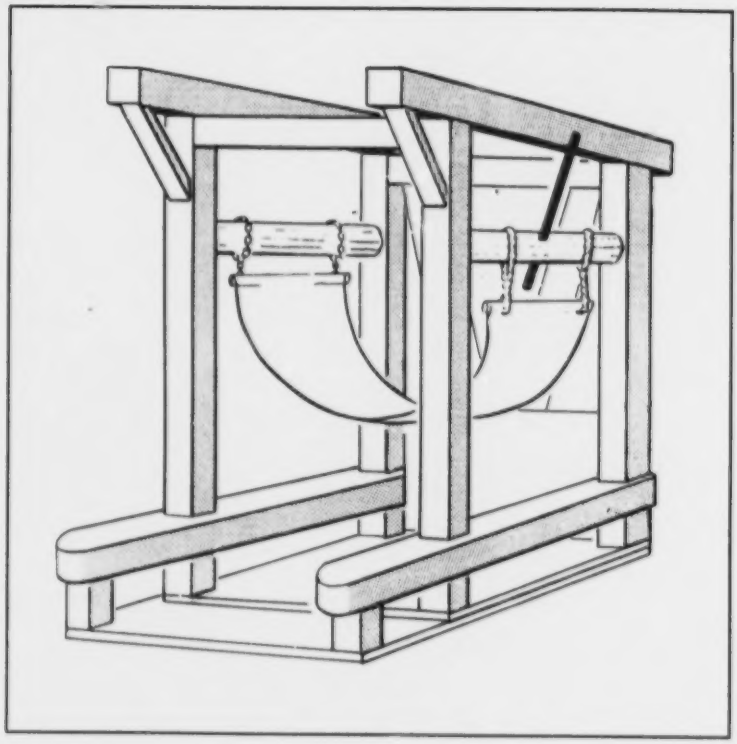
  - **squeeze chute and headgate** – the animal's head is locked between the bars, the sides are moveable; keeps the animal completely immobilized; can usually protect the handler from being kicked or stepped on (Figure 1)

FIGURE 1



- **cattle stock** (Figure 2)

FIGURE 2

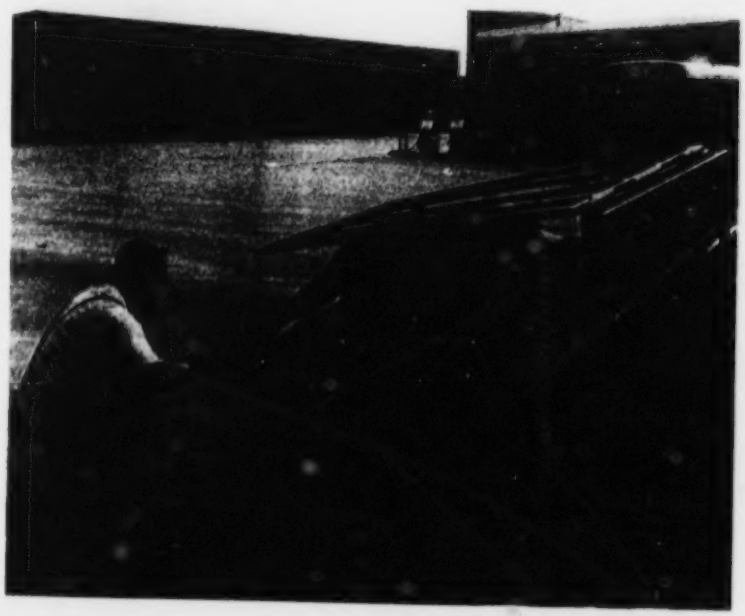


- **tilting calf table** (Figure 3)

FIGURE 3

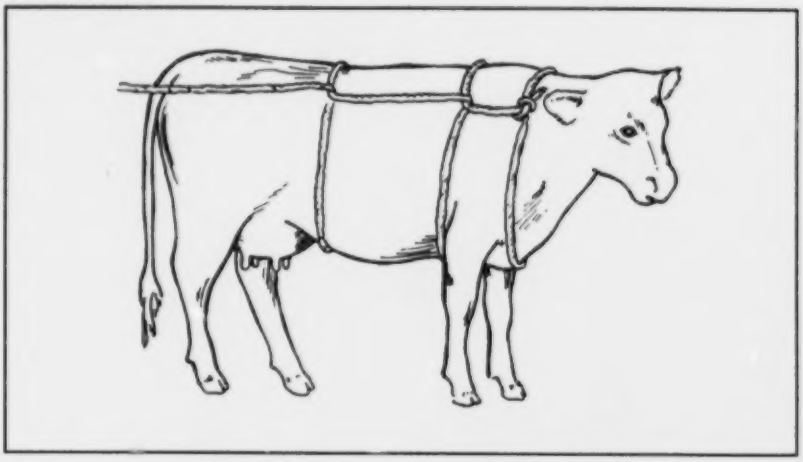
- **tilting table stock** (Figure 4)

FIGURE 4



- **Physical restraints**
  - **rope squeeze casting** – use to get an animal to lie down (Figure 5)

FIGURE 5

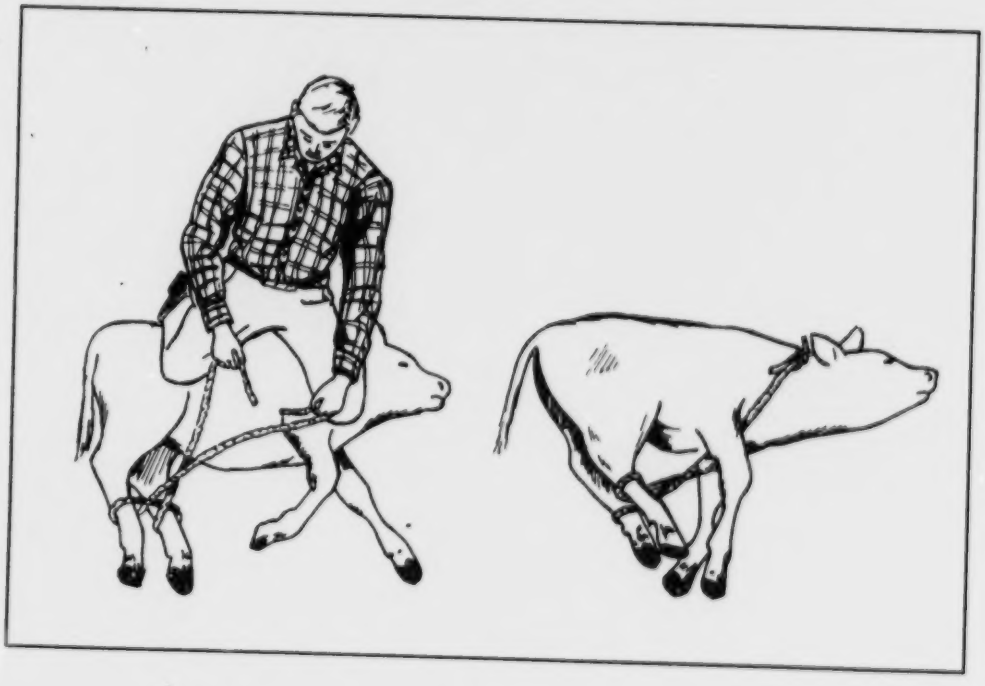


- **castration restraint** (Figure 6)

FIGURE 6

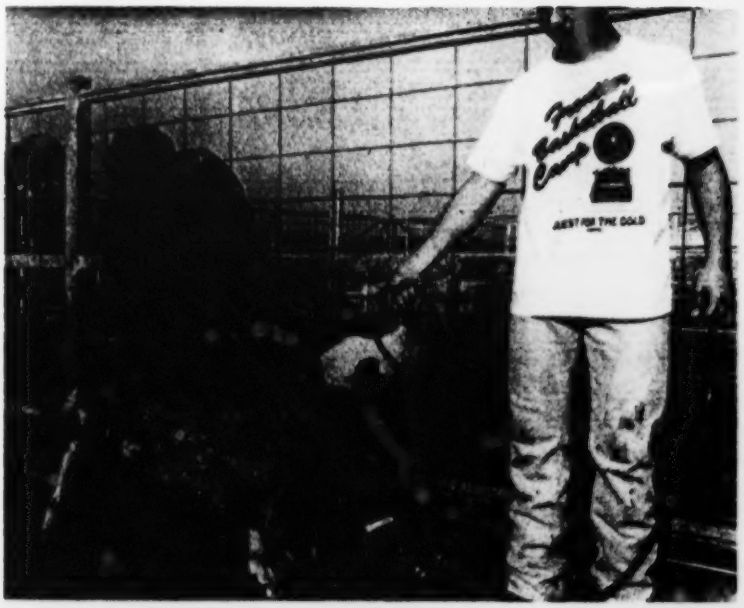
- **calf castration tie** (Figure 7)

FIGURE 7



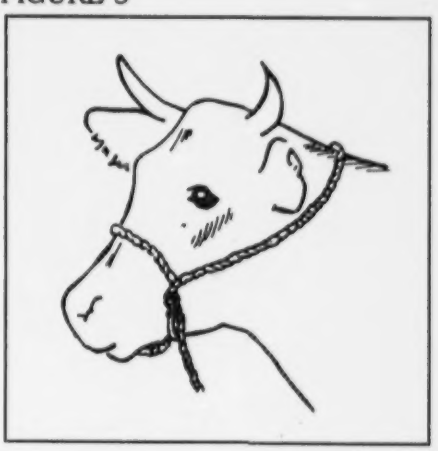
- **Catching methods**
  - **flank casting** (Figure 8)

FIGURE 8



  - **rope** – restrains the animal's head; used for checking the position of an unborn calf, assisting with birth (Figure 9)

FIGURE 9



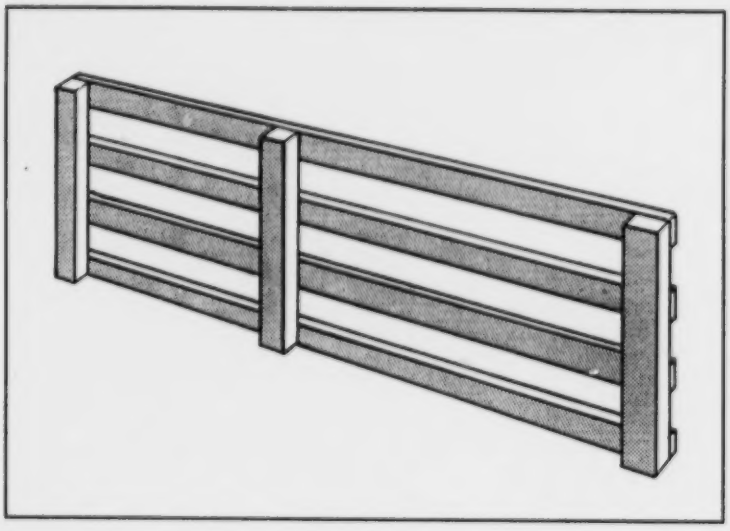
Sheep

- **Mechanical restraints**
  - **trimming table** (Figure 10)

FIGURE 10

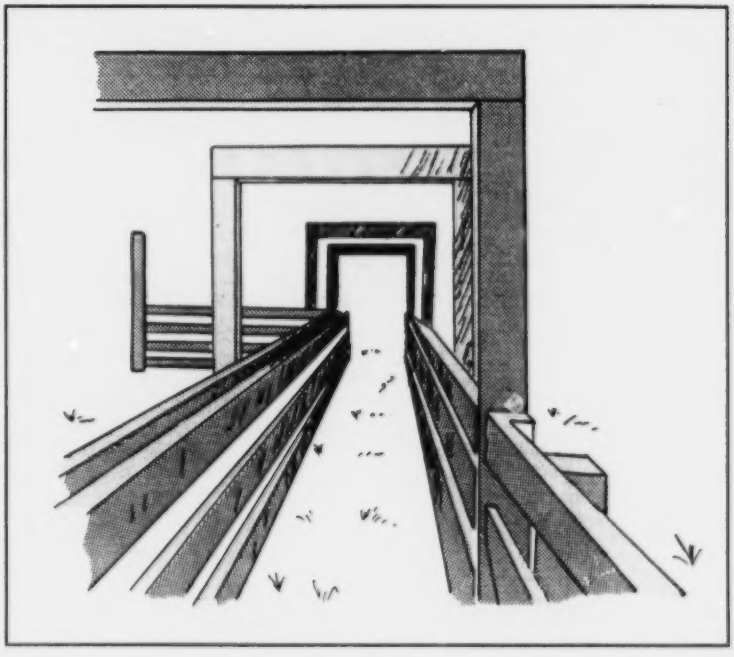
  - **panels** (Figure 11)

FIGURE 11



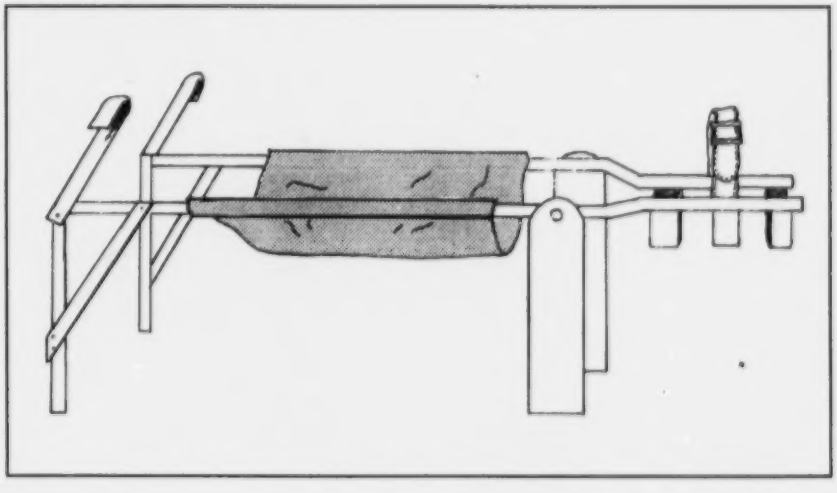
- **chute** (Figure 12)

FIGURE 12



- **pregnancy testing table** (Figure 13)

FIGURE 13

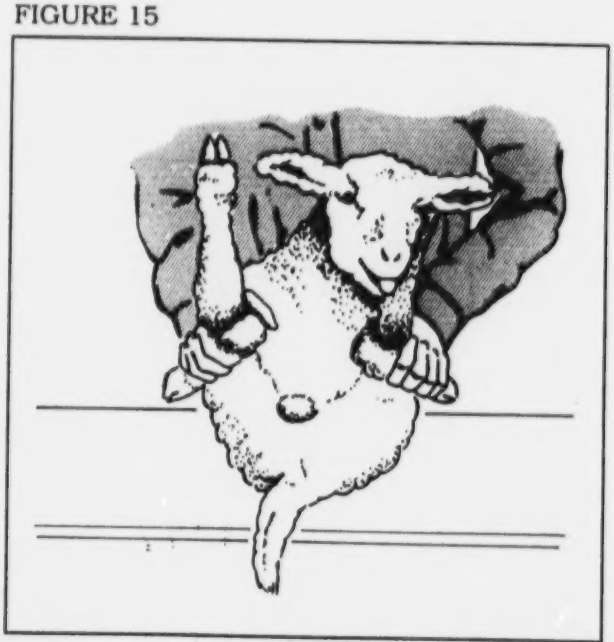


- **Physical restraints**
  - **chin catch restraint** (Figure 14)

FIGURE 14

  - **castration and docking restraint for small sheep** (Figure 15)

FIGURE 15



- **shearing stance** (Figure 16)

FIGURE 16

- **halter** – restrains the animal's head; used for checking the position of an unborn lamb, assisting with birth (Figure 17)

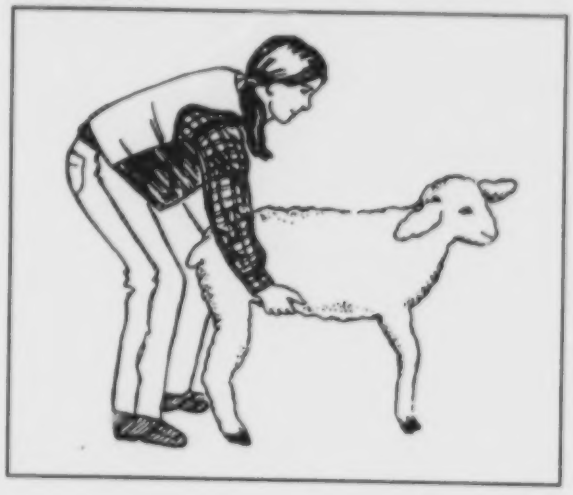
FIGURE 17

- **Catching methods**

  ☑ **NOTE:** Never catch sheep by their wool.

  ☐ **flank catch** (Figure 18)

FIGURE 18



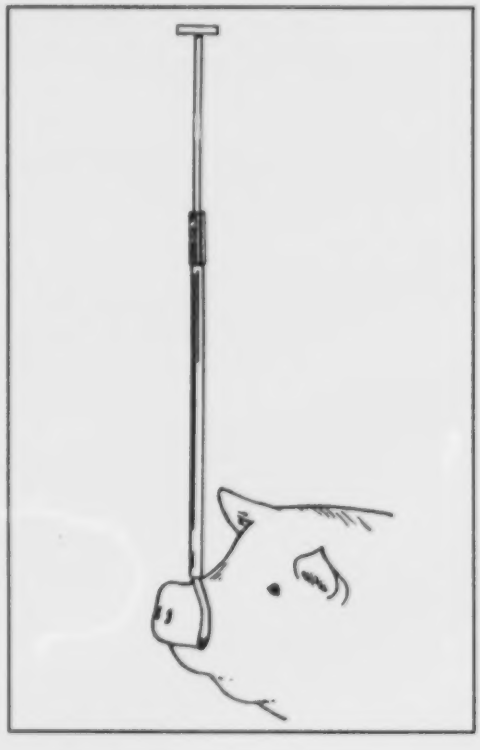
  ☐ **chin catch restraint** (Figure 19)

FIGURE 19

Swine

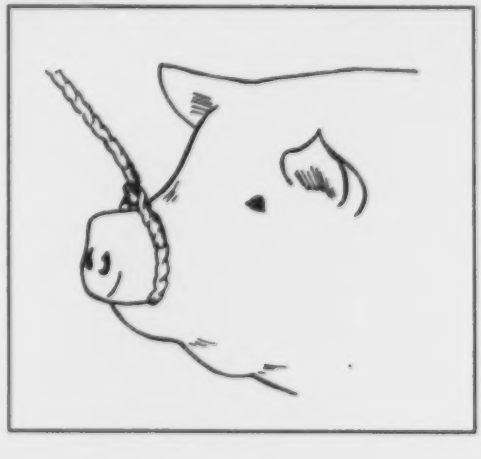
- **Mechanical restraints**
  - **hog holder** – a commercial device with a loop that fits around the upper jaw and restrains the head (Figure 20)

FIGURE 20



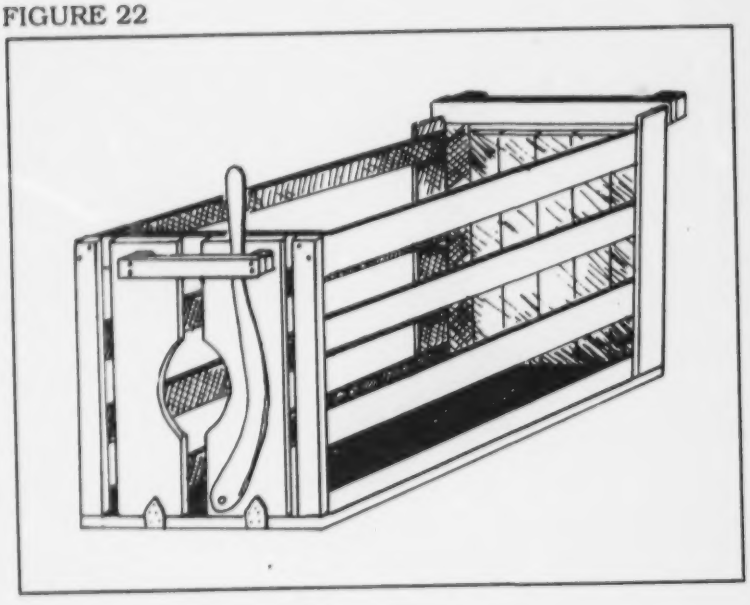
  - **snubbing rope** (snare) – used to immobilize the head; the upper jaw is caught in a loop of rope or cable (Figure 21)

FIGURE 21



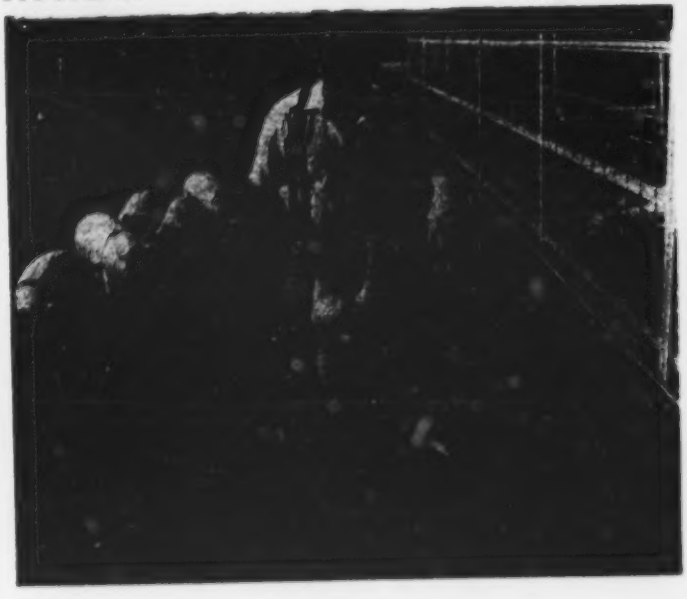
- **pig trap** (Figure 22)

FIGURE 22



- **Physical restraints**
  - **vaccination or castration restraint for small pigs** (Figure 23)

FIGURE 23

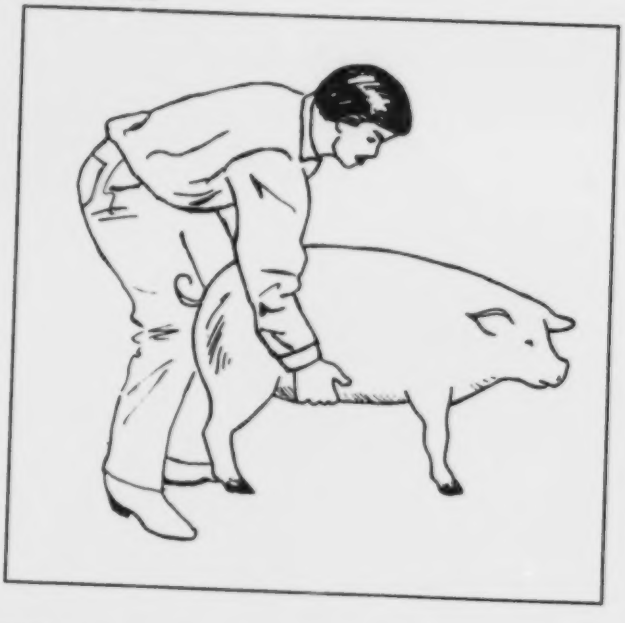


- **vaccination or castration restraint for large pigs** (Figure 24)

FIGURE 24

- **Catching methods**
  - **flank** (Figure 25)

FIGURE 25



- **heart girth** (Figure 26)

FIGURE 26

Poultry

Poultry restraint is a physical restraint, holding and carrying the bird to prevent overexcitement and maintain control.

☞ **NOTE:** One of the primary factors considered by poultry graders is appearance. The top priority is a well-finished, thick meated, and full-breasted bird that will be a top grade bird if it is properly dressed. Much of the appearance of a bird is dependent upon the way it is handled. It is necessary to avoid bruises, abrasions, or broken limbs since this detracts from the quality grade. Many times birds are moved in the dark to avoid overexciting them. Over-heated and over-excited birds will have a lower keeping quality.

1. Approach the cage slowly. Maneuver the chicken until its head is facing to your right if you are right-handed, to your left if you are left-handed.

2. Reach your dominant hand over the bird's back, grasp the opposite wing firmly, holding it so that it remains folded.

3. Pull the chicken toward you with its head pointed toward the coop door. With your other hand, fold its other wing.

4. Slide that hand, palm upward, underneath the bird's breast. Use your thumb to hold the wing.

5. Lift the chicken from the coop, head first. Slide your top hand back to grasp the legs.

6. Always put the bird back into the coop head first. Stand with your non-dominant side to the coop and give the bird a gentle toss as you put it through the door.

OBJECTIVE 20

Select true statements about chemical restraints.

Required Activities/ Resources
- See Unit C-4, "Vaccination and Drugs"

Optional Activities/ Resources
- Demonstration of how chemical restraints are used.

WORDS YOU SHOULD KNOW	
anesthetic	a drug that produces an insensibility to pain
balling gun	a device with a plunger and barrel for placing pills down the throat so the animal can't spit it out
bolus	a large pill
intramuscular	within the muscles
suture	to sew together the sides of a wound

- Chemical restraints are substances that react with the animal's body to deaden pain or to calm or tranquilize the animal.
  - A local anesthetic is used at the site of an injury to deaden the nerve endings so the animal doesn't feel pain and the wound can be treated (cleaned and sutured).
  - A tranquilizer is used to calm an animal that may be injured and frightened or too wild to work on. Tranquilizers affect the nervous system, slowing down the nerve impulses to and from the brain and slowing the animal's reactions.

    ☛ **NOTE:** Sometimes a tranquilizer is used to help tame an animal that is too wild or too high strung to handle. The animal may be slightly tranquilized so its nerves will settle down and it can get accustomed to handling. An animal with tranquilizers in its blood stream is not permitted to compete in shows.
- Chemical restraints are available only from a veterinarian.
- They may be administered orally or by intramuscular injection.
  - **oral administration** – giving the drug by mouth, such as squirting a liquid so it is absorbed through the mucous membranes or placing a bolus in the throat with a balling gun

- **intramuscular injection** – an injection made deep into large muscles using a needle at least 3/4 of an inch long

OBJECTIVE 21 — **Complete Job Sheet 5.**

OBJECTIVE 22 — **Complete Job Sheet 6.**

OBJECTIVE 23 — **Complete Job Sheet 7.**

- **intramuscular injection** – an injection made deep into large muscles using a needle at least 3/4 of an inch long

OBJECTIVE 21 **Complete Job Sheet 5.**

OBJECTIVE 22 **Complete Job Sheet 6.**

OBJECTIVE 23 **Complete Job Sheet 7.**

ASSIGNMENT SHEET

ANIMAL HEALTH CARE

C-1

Name _____ Score _____

OBJECTIVE 9

Adapt an animal health care plan to your individual needs.

EQUIPMENT AND SUPPLIES

- OSU Extension Facts No. 3861, *A Planning Calendar for Sheep Herd Health and Management*, OR
- OSU Extension Facts No. 3260, *A Planning Calendar for Beef Cattle Herd Health*
- Your school calendar and ag calendar for the current year

INSTRUCTIONS

Reading Comprehension
- Gain factual information

Research and Reference
- Use magazines and newspapers

Cognitive Activities
- Create a finished product

Using one of the planning calendars and your school calendars, adapt the planning schedule so that you can complete the necessary activities within the restriction of your school activities, such as test periods, vacations, stock shows, etc. Assume that you have a herd of either 25 cattle or sheep with one or two males. Write the dates on your OSU Extension Facts sheet.

JOB SHEET 1	ANIMAL HEALTH CARE	C-1

Name _____

OBJECTIVE 5

Take an animal's temperature.

EQUIPMENT AND SUPPLIES

- Method of restraint
- Animal
- Veterinary thermometer, mercury or digital
- Wrapping string
- Alligator clip
- Watch with a sweep second hand or digital second display
- Nonirritating lubricant such as petroleum jelly
- Antiseptic
- Sterile cotton balls or swabs to apply the antiseptic
- Cotton balls, tissue, or cloth to wipe the thermometer
- Record-keeping materials: records, pencil or pen

FIGURE 1

How to read the veterinary thermometer:

Read with the sharpest edge of the thermometer toward you.

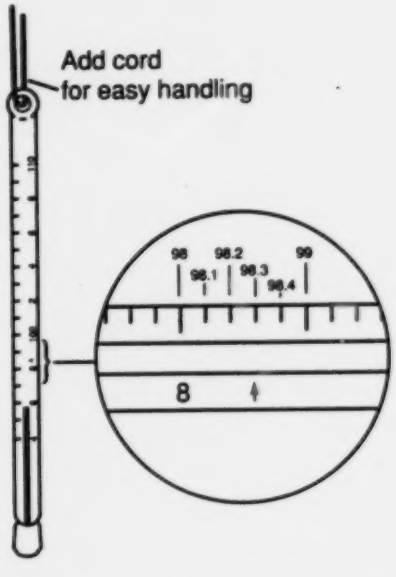
Roll the thermometer back and forth until you can see the bar of mercury.

Long marks = 1° F.

Short marks = 1/5° F.

Only even numbers are marked:
96° 98° 100°

The degree mark at the point where the mercury stops is the animal's temperature.



PROCEDURE

Functional Reading
- Follow written instructions
- Interpret graphics and symbols

Life Science
- Investigate/apply principles of anatomy/physiology

Job Acquisition/ Development
- Master specific job task/procedure
- Practice good work habits/attitudes

	Yes	No
1. Attach a 10- to 12-inch length of wrapping string to the loop on the end of the thermometer.	___	___
2. Attach an alligator clip to the other end of the string.	___	___
☛ **NOTE:** Attaching a string and clip to the thermometer allows it to be inserted and then clipped to the tail hairs. Also, the thermometer can be retrieved if it is expelled or is pulled into the rectum.		
3. **Mercury thermometer:** hold the thermometer at the loop end of the barrel and shake it until the thermometer reads below 96° F.	___	___
☛ **NOTE:** Maintain a tight grip on the end of the thermometer and shake it with your wrist relaxed.		
Digital thermometer: Set switch in "ON" position.	___	___
4. Restrain the animal.	___	___
5. Coat the thermometer with lubricant so it will slip easily into the rectum.	___	___
☛ **NOTE:** A dry thermometer will adhere to the anus and cause irritation.		

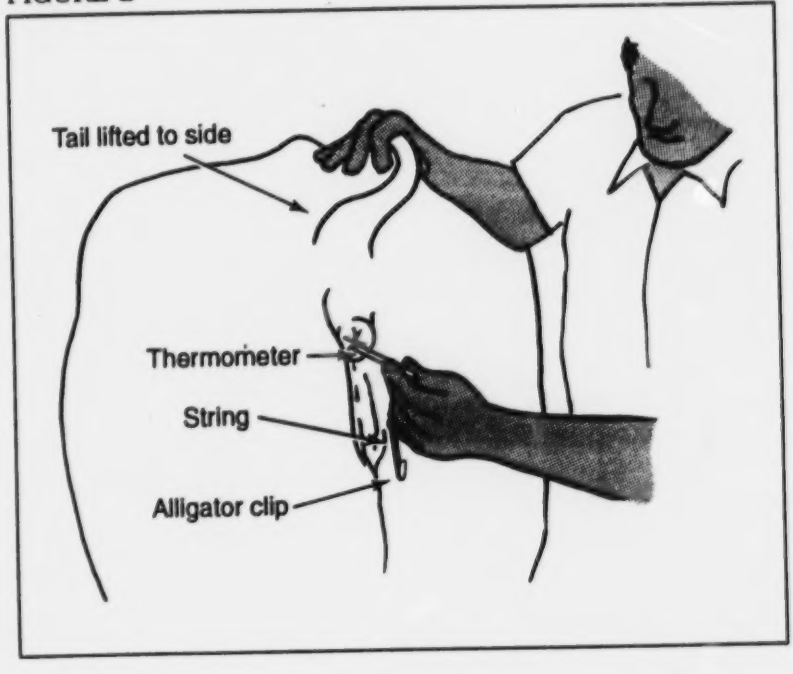
⚠ **CAUTION:** THE ANIMAL MAY KICK WITHOUT PROVOCATION. Do not approach the animal from directly behind and do not stand directly behind the animal once you are next to it.

6. Approach the animal's side and work rearward until you are standing next to its hip.	___	___

CAUTION: DO NOT LIFT THE ANIMAL'S TAIL STRAIGHT UP. It is uncomfortable for most animals and will certainly provoke resistance.

	Yes	No
7. Raise the animal's tail and pull or push it to one side to expose the rectum. (Figure 2)	____	____
8. Insert the thermometer into the rectum with a slight rotating motion, pushing the thermometer in until only about 1-1½ inches of the barrel is outside the rectum. (Figure 2)	____	____

FIGURE 2



	Yes	No
9. Attach the clip to a clump of tail hairs and test the attachment by tugging on the clip. (Figure 3)	___	___

FIGURE 3

10. Allow the thermometer to remain in place in the rectum for at least two to three minutes.	___	___
☛ **NOTE:** The tail can be released once the thermometer is positioned.		
11. Remove the thermometer by pulling on the string.	___	___
12. Wipe the thermometer clean with a cotton ball, paper tissue, or cloth.	___	___
13. Hold the thermometer so that the numbers are almost facing your chest; rotate it back and forth until you can see the mercury line and take your reading.	___	___
14. Record your reading.	___	___
15. Release the animal.	___	___
16. Disinfect the thermometer with antiseptic, dry it, and return it to the case.	___	___

		Yes	No
17.	Put away your tools and materials and clean the work area.	____	____

SKILL TEST RECORD

EVALUATOR'S COMMENTS

_____

_____

_____

PRODUCT EVALUATION

Evaluator note: Rate the student on the following criteria by circling the appropriate numbers. Each criterion must receive a rating of "3" or higher to demonstrate student mastery. (See Key below.) A student who is unable to demonstrate mastery should review the material and submit another product for evaluation.

Criteria:				
Followed safety precautions	4	3	2	1
Successfully took the animal's temperature	4	3	2	1
Handled animal properly	4	3	2	1

AVERAGE RATING

Evaluator note: To obtain an average rating for the Competency Profile, total the points in Product Evaluation and divide by the total number of criteria. Circle the rating on the Key.

KEY

4 **Skilled** – Can perform job with no additional training.
3 **Moderately Skilled** – Has performed job during training program; limited additional training may be required.
2 **Limited Skill** – Has performed job during training program; additional training is required to develop skill.
1 **Unskilled** – Is familiar with process, but is unable to perform job.

EVALUATOR'S COMMENTS

JOB SHEET 2

ANIMAL HEALTH CARE

C-1

Name _____

OBJECTIVE 6

Check an animal for signs of good health.

EQUIPMENT AND SUPPLIES

- Veterinary thermometer
- Cow, sheep, and pig
- Health record book, pencil or pen
- Watch with a sweep second hand or digital second display

PROCEDURE

Functional Reading
- Follow written instructions
- Interpret graphics and symbols

Life Science
- Investigate/apply principles of anatomy/physiology
- Investigate health issues

Cognitive Activities
- Collect/record information
- Transfer knowledge/training to new situations

	Yes	No
1. Record the animal's name or number.	____	____
2. Record the date and time of day.	____	____
3. Take the animal's temperature.	____	____
4. Record the temperature.	____	____
6. Check the rate of respiration.		
a. Be sure the animal is calm and relaxed.	____	____
b. Watch the rib cage move in and out as the animal breathes.	____	____
c. Count the number of breaths (in-and-out motions) in one minute.	____	____
d. Record the respiration rate.	____	____
7. Check the rumen in cows and sheep.		
a. Press firmly on the left flank.	____	____
b. Be certain you can clearly feel the rumen as it rolls (contracts and churns) under your hand.	____	____

Job Acquisition/ Development
- Master specific job task/procedure
- Practice good work habits/attitudes

	Yes	No
c. Count the number of rolls in one minute.	____	____
NOTE: The normal rate is one to two contractions per minute.		
d. Record the rate of rumen contraction.	____	____
8. Check the color of the mucous membranes.		
a. Check the inside of the eyelid, inside of the lip, and/or inside the lips of the vulva.	____	____
b. Look for pink, healthy color; not pale or inflamed.	____	____
9. Record the color of the mucous membranes.	____	____
NOTE: You can record, "normal," or write a specific description for items that don't have exact figures.		
10. Check the condition of the eyes: Look for bright, clear set eyes with no redness, discharge, or cloudiness.	____	____
11. Record the condition of the eyes.	____	____
12. Check hydration: Pinch the skin on the neck.	____	____
▫ Normal hydration – The skin will go right back down.		
▫ Dehydration – The skin will remain standing up as you have pinched it.		
▫ Edema (water retention) – The skin will retain the indentation made by your fingers.		
13. Record your observation of hydration level.	____	____
14. Check for abnormalities: Run your hands over the animal, feeling the texture of the coat and smoothness of the skin, and feeling for cuts, insects, lumps, etc.	____	____
15. Record your observations.	____	____

	Yes	No
16. Check the general condition of the animal.		
a. Walk around the animal and look at it carefully.	____	____
b. Watch the animal walk.	____	____
17. Record your observations of the animal's general condition.	____	____
18. Release the animal.	____	____
19. Check the animal's stool for consistency and record a normal or abnormal condition.	____	____
20. Compare your observations with the norms.	____	____
21. Repeat the health check with another animal.	____	____
22. Have your instructor check your work.	____	____
23. Put away your supplies and clean the area.	____	____

SKILL TEST RECORD

EVALUATOR'S COMMENTS

_____

_____

_____

PRODUCT EVALUATION

Evaluator note: Rate the student on the following criteria by circling the appropriate numbers. Each criterion must receive a rating of "3" or higher to demonstrate student mastery. (See Key below.) A student who is unable to demonstrate mastery should review the material and submit another product for evaluation.

Criteria:

Accuracy in observations	4	3	2	1
Handled animals properly	4	3	2	1

Observed safety precautions	4	3	2	1
Kept accurate records	4	3	2	1

AVERAGE RATING

Evaluator note: To obtain an average rating for the Competency Profile, total the points in Product Evaluation and divide by the total number of criteria. Circle the rating on the Key.

KEY

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2 **Limited Skill** – Has performed job during training program; additional training is required to develop skill.
1 **Unskilled** – Is familiar with process, but is unable to perform job.

EVALUATOR'S COMMENTS

JOB SHEET 3

ANIMAL HEALTH CARE

C-1

Name _____

OBJECTIVE 14

Collect fresh urine and fecal samples.

EQUIPMENT AND SUPPLIES

- Three clean jars with tight, screw-on lids
- Clean knife, tongue depressor, or other tool for gathering fecal sample
- Rag or paper towels
- Plastic gloves
- labels
- pencil or pen
- health records
- animal for taking samples

PROCEDURE

Functional Reading
- Follow written instructions
- Interpret graphics and symbols

Life Science
- Investigate/apply principles of anatomy/physiology

Job Acquisition/ Development
- Master specific job task/procedure
- Practice good work habits/attitudes

Fecal sample	Yes	No
1. Watch the animal to obtain a sample of the stool fresh out of the body.	____	____
2. Scrape up a small amount with your knife or other tool and place it in a jar.	____	____
3. Put the lid on the jar and tighten it.	____	____
4. Label the jar with your name, the animal name or number, and the date collected.	____	____
5. Refrigerate the sample until it can be delivered to the vet.	____	____
6. Have your instructor check your work.	____	____
7. Clean and disinfect your knife or other tool or throw it away if it's disposable.	____	____
Urine sample		
1. Restrain the animal.	____	____
2. Put on the gloves.	____	____

	Yes	No
Males		
a. Place a clean jar at the end of the urethra.	____	____
b. Stroke below the sheath until the animal urinates.	____	____
Females		
a. Place a clean jar at the end of the urethra.	____	____
b. Stroke along the vulva until the animal urinates.	____	____
3. Catch the urine in the jar.	____	____
4. Collect about a half a cup.	____	____
5. Put the lid on the jar and close tightly.	____	____
6. Wipe the jar dry with the rag or paper towels.	____	____
7. Label the jar with your name, the animal name or number, and the date collected.	____	____
8. Refrigerate the sample until it can be delivered to the vet.	____	____
9. Remove gloves and wash your hands.	____	____
10. Have your instructor check your work.	____	____
11. Release the animal.	____	____
12. Dispose of gloves properly and clean the area.	____	____

SKILL TEST RECORD

EVALUATOR'S COMMENTS

_____

_____

_____

PRODUCT EVALUATION

Evaluator note: Rate the student on the following criteria by circling the appropriate numbers. Each criterion must receive a rating of "3" or higher to demonstrate student mastery. (See Key below.) A student who is unable to demonstrate mastery should review the material and submit another product for evaluation.

Criteria:

Obtained samples in good time	4	3	2	1
Handled animals properly	4	3	2	1
Observed safety precautions	4	3	2	1

AVERAGE RATING

Evaluator note: To obtain an average rating for the Competency Profile, total the points in Product Evaluation and divide by the total number of criteria. Circle the rating on the Key.

KEY

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1 **Unskilled** – Is familiar with process, but is unable to perform job.

EVALUATOR'S COMMENTS

JOB SHEET 4	ANIMAL HEALTH CARE	C-1

Name _____

OBJECTIVE 16

Treat wounds.

☞ **NOTE:** In the field and in emergency situations, you may not have all the proper supplies and equipment. You may have to use your common sense (based on your confidence and training) and use what's available to you at the time. Call a vet with any serious wound or an injury you don't feel competent to handle.

EQUIPMENT AND SUPPLIES

- Mild soap
- Water
- Plastic gloves
- Sterile gauze pads
- Scissors
- Tweezers
- Topical antibiotic
- Injured animal or simulated wound (i.e. wet sponge with debris)
- Disinfectant
- Record book and pencil or pen
- Tourniquet materials:
  - Strip of cloth two inches wide or more
  - Stick
  - Simulated animal leg (i.e. tube sock filled with sand)

PROCEDURE

Functional Reading
- Follow written instructions
- Interpret graphics and symbols

☞ **NOTE:** If you are using simulated items, tell your instructor each step in the procedure that you would perform on a live animal.

	Yes	No
1. Restrain the animal.	____	____
2. Wash and dry your hands and put on gloves.	____	____
3. Examine the wound and determine the extent of the injury.	____	____

Job Acquisition/ Development

- Master specific job task/procedure
- Practice good work habits/attitudes

	Yes	No
4. Stop the bleeding.		
a. Hold the gauze pad over the wound and apply mild, steady pressure to the wound; or	____	____
b. If you can identify the arteries above the wound, apply pressure to the arteries, using the heel of your hand or the flat part of your fingertips and keeping your elbow straight to reduce exhaustion and maintain even pressure.	____	____
c. If the pad becomes soaked with blood, add more bandages and maintain the pressure until the bleeding stops.	____	____
5. Carefully remove the gauze pads.	____	____
6. Cut the hair (wool), if needed.	____	____
7. Gently wash the area with gauze pads, soap, and water.	____	____
☛ **NOTE:** Be careful not to start the bleeding again.		
8. Remove hair, pieces of skin, dirt, splinters, grass, etc., with your fingers and with the tweezers.	____	____
9. When the wound is clean, pat it dry with a gauze pad.	____	____
10. Apply a topical antibiotic.	____	____
11. Have your instructor check your work.	____	____
12. Release the animal.	____	____
13. Clean and disinfect your tools, put away supplies, and clean the area.	____	____

PROCEDURE

Apply a tourniquet.

DANGER: USE A TOURNIQUET ONLY AS A LAST RESORT. The decision to use a tourniquet is a decision to risk losing a limb to save the animal's life.

☞ **NOTE:** You can use a piece of cloth or rope tied tightly above the wound and place a padded board or stone on top of it to increase the pressure, or you can use the cloth and stick method below.

	Yes	No
1. Restrain the animal.	____	____
2. Place the cloth and stick within easy reach.	____	____
3. Locate a point above the wound where you can apply the tourniquet:		
a. between the heart and the wound, and close to the wound.	____	____
b. if the wound is below or in a joint, apply the tourniquet immediately above the joint.	____	____
4. Wrap the tourniquet twice around the limb, keeping it tight.	____	____
5. Tie a half knot.	____	____
6. Put a short, strong stick or similar object on the knot, leaving one end of the stick longer than the other.	____	____
7. Tie two knots over the top of the stick.	____	____
8. Turn the stick to tighten the tourniquet until the bleeding stops.	____	____
9. Tie the stick in place with the loose ends of the cloth or with another piece of cloth or other material, such as string or rope.	____	____
10. Record the location of the tourniquet and the time you put it in place to report to the vet.	____	____

DANGER: NEVER LEAVE A TOURNIQUET IN PLACE FOR MORE THAN 20 MINUTES. Serious injury to the tissue will occur if the tourniquet is too tight or remains in place too long.

	Yes	No
11. Check to see if the bleeding has stopped after 12-15 minutes.	____	____
12. If bleeding has stopped, leave the tourniquet loosely in place so it can be retightened, if necessary.	____	____
13. If bleeding has not stopped, retighten the tourniquet immediately.	____	____
14. Have your instructor check your work.	____	____
15. Put away your supplies and clean the work area.	____	____

SKILL TEST RECORD

EVALUATOR'S COMMENTS

_____

_____

_____

PRODUCT EVALUATION

Evaluator note: Rate the student on the following criteria by circling the appropriate numbers. Each criterion must receive a rating of "3" or higher to demonstrate student mastery. (See Key below.) A student who is unable to demonstrate mastery should review the material and submit another product for evaluation.

Criteria:				
Observed safety precautions	4	3	2	1
Handled animal properly/ Verbal responses appropriate	4	3	2	1

AVERAGE RATING

Evaluator note: To obtain an average rating for the Competency Profile, total the points in Product Evaluation and divide by the total number of criteria. Circle the rating on the Key.

KEY

4 **Skilled** – Can perform job with no additional training.
3 **Moderately Skilled** – Has performed job during training program; limited additional training may be required.
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1 **Unskilled** – Is familiar with process, but is unable to perform job.

EVALUATOR'S COMMENTS

_____

_____

_____

JOB SHEET 5

ANIMAL HEALTH CARE

C-1

Name _____

OBJECTIVE 21

Use flank casting and castration restraint on cattle.

EQUIPMENT AND SUPPLIES

- Lightweight calf, 250-300 lbs
- Rope
- Someone to assist

PROCEDURE

Functional Reading
- Follow written instructions

Job Acquisition/ Development
- Master specific job task/procedure
- Practice good work habits/attitudes

Flank Casting

	Yes	No
1. Rope the calf.	____	____
2. Approach the calf with confidence and accuracy, and don't overexcite it.	____	____
3. Reach across the calf's back and grasp the hindflank and foreleg with your hands. (Figure 1)	____	____

FIGURE 1

	Yes	No
4. Lift the calf from the ground with your arms pulling on the hindflank and foreleg and your knees pushing on the calf's side. (Figure 2)	____	____

FIGURE 2

5. Ease the calf down with its weight against your legs so that the calf falls to the ground gently.	____	____
6. Have your instructor check your work.	____	____

☛ **NOTE:** Continue to the castration restraint procedure.

PROCEDURE

Castration restraint.

1. Release the hindflank quickly and grasp the foreleg with both hands.	____	____
2. Place one knee on the calf's neck and other knee behind its shoulders, facing the calf's foreleg.	____	____
3. Pull the calf's foreleg up toward your stomach. (Figure 3)	____	____

FIGURE 3

☛ **NOTE:** The following steps are performed by the person assisting.

	Yes	No
4. Grab the upper hind leg at the hock and ankle with your hands and pull the leg back from the calf. (Figure 4)	____	____
5. Sit down behind the calf with one leg out toward the calf's rump and the other leg pushing on the calf's bottom hind leg just above the hock and move the calf's leg out as far forward as possible. (Figure 4)	____	____

FIGURE 4

	Yes	No
6. Have your instructor check your work.	____	____
7. Release the calf.	____	____

SKILL TEST RECORD

EVALUATOR'S COMMENTS

_____

_____

_____

PRODUCT EVALUATION

Evaluator note: Rate the student on the following criteria by circling the appropriate numbers. Each criterion must receive a rating of "3" or higher to demonstrate student mastery. (See Key below.) A student who is unable to demonstrate mastery should review the material and submit another product for evaluation.

Criteria:

Observed safety precautions	4	3	2	1
Successfully restrained calf	4	3	2	1
Handled animal properly	4	3	2	1

AVERAGE RATING

Evaluator note: To obtain an average rating for the Competency Profile, total the points in Product Evaluation and divide by the total number of criteria. Circle the rating on the Key.

KEY

4 **Skilled** – Can perform job with no additional training.
3 **Moderately Skilled** – Has performed job during training program; limited additional training may be required.
2 **Limited Skill** – Has performed job during training program; additional training is required to develop skill.
1 **Unskilled** – Is familiar with process, but is unable to perform job.

EVALUATOR'S COMMENTS

JOB SHEET 6

ANIMAL HEALTH CARE

C-1

Name _____

OBJECTIVE 22

Use vaccination or castration restraint on small pigs.

EQUIPMENT AND SUPPLIES

- Weaning age pig or pig under 60 lbs

PROCEDURE

Functional Reading
- Follow written instructions
- Interpret graphics and symbols

Job Acquisition/ Development
- Master specific job task/procedure
- Practice good work habits/attitudes

	Yes	No
1. Grab the pig by the hind legs with your hands.	____	____
2. Pick the pig up off the ground, pulling it toward your body.	____	____
3. For castration, hold the pig's back against you. (Figure 1)	____	____

FIGURE 1

Castration restraint

	Yes	No
4. For vaccination, hold the pig with its abdomen against you and it's shoulders between your legs. (Figure 2)	____	____

FIGURE 2

Vaccination restraint

5. Have your instructor check your work.	____	____
6. Release the pig.	____	____

SKILL TEST RECORD

EVALUATOR'S COMMENTS

_____

_____

_____

PRODUCT EVALUATION

Evaluator note: Rate the student on the following criteria by circling the appropriate numbers. Each criterion must receive a rating of "3" or higher to demonstrate student mastery. (See Key below.) A student who is unable to demonstrate mastery should review the material and submit another product for evaluation.

Criteria:

Successfully restrained pig	4	3	2	1
Handled animal properly	4	3	2	1

AVERAGE RATING

Evaluator note: To obtain an average rating for the Competency Profile, total the points in Product Evaluation and divide by the total number of criteria. Circle the rating on the Key.

KEY

4 **Skilled** – Can perform job with no additional training.
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EVALUATOR'S COMMENTS

JOB SHEET 7	ANIMAL HEALTH CARE	C-1

Name _____

OBJECTIVE 23

Use castration and docking restraint on small sheep.

EQUIPMENT AND SUPPLIES

- Young lamb
- Work table

PROCEDURE

Functional Reading
- Follow written instructions
- Interpret graphics and symbols

Job Acquisition/ Development
- Master specific job task/procedure
- Practice good work habits/attitudes

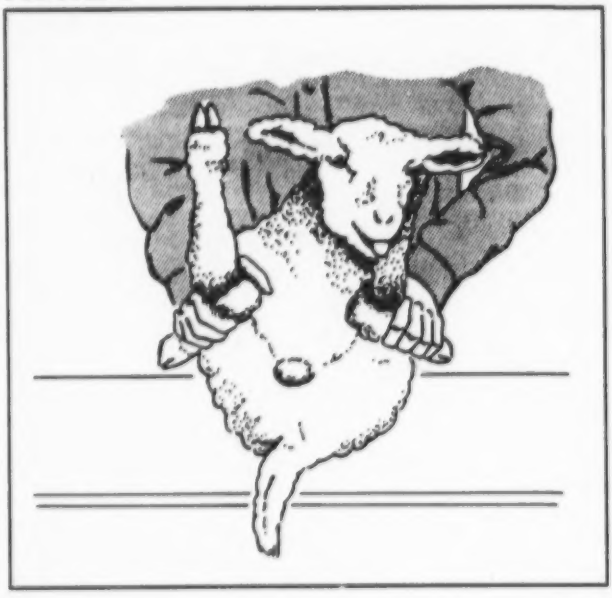
	Yes	No
1. Catch the lamb by the flank. (Figure 1)	____	____

FIGURE 1

2. Hold the lamb with its back against you and its head up.	____	____

	Yes	No
3. Bring the lamb's front legs down and hook them over each hind leg. (Figure 2)	____	____
4. Rest the lamb's rump on the work table. (Figure 2)	____	____

FIGURE 2



5. Have your instructor check your work.	____	____
6. Release the lamb on the ground.	____	____

SKILL TEST RECORD

EVALUATOR'S COMMENTS

_____

_____

_____

PRODUCT EVALUATION

Evaluator note: Rate the student on the following criteria by circling the appropriate numbers. Each criterion must receive a rating of "3" or higher to demonstrate student mastery. (See Key below.) A student who is unable to demonstrate mastery should review the material and submit another product for evaluation.

Criteria:

Restrained lamb	4	3	2	1
Handled animal properly	4	3	2	1

AVERAGE RATING

Evaluator note: To obtain an average rating for the Competency Profile, total the points in Product Evaluation and divide by the total number of criteria. Circle the rating on the Key.

KEY

4 **Skilled** – Can perform job with no additional training.
3 **Moderately Skilled** – Has performed job during training program; limited additional training may be required.
2 **Limited Skill** – Has performed job during training program; additional training is required to develop skill.
1 **Unskilled** – Is familiar with process, but is unable to perform job.

EVALUATOR'S COMMENTS

OBJECTIVE SHEET

LIVESTOCK DISEASES AND PARASITES

C-2

INTRODUCTION

Diseases and parasites costs farms millions of dollars a year. In this unit, you will learn to identify common parasites and diseases. More importantly, you will learn how to prevent and control diseases and parasites from affecting stock.

PREREQUISITES

None

FOCUS ASSIGNMENTS

FOCUS ASSIGNMENTS	
PREREADING:	*A Guide for Developing a Preventive Medicine Program*, by Thomas R. Thedford, OSU Extension Facts No. 3993.
WRITING:	Write a short essay (one paragraph to one page) about the financial burden caused by diseases and the procedures that should be followed to reduce the risk of disease.

Reading Comprehension
- Gain factual information

Language
- Use standard grammar, spelling, and capitalization
- State ideas clearly

Composition
- Use complete sentences
- Proofread and edit

UNIT OBJECTIVE

After completing this unit, you will show the following competencies by mastering the activities on the Assignment Sheets and by scoring at least 85% on the Written Test.

1. Choose the word or phrase to complete statements about livestock diseases and parasites.
2. Arrange in order the life cycle stages of an internal parasite.
3. Match common internal parasites to their descriptions.
4. Arrange in order the life cycle stages of external parasites.

5. Match common external parasites to their descriptions.

6. Discuss parasite control.

7. Determine prevention and controls for common parasites. (Assignment Sheet 1)

8. Match common infectious diseases to their descriptions.

9. Match common noninfectious diseases to their descriptions.

10. Discuss disease prevention.

11. Determine common diseases, treatments, and preventive measures for cattle, sheep, swine, and poultry. (Assignment Sheet 2)

INFORMATION SHEET

LIVESTOCK DISEASES AND PARASITES

C-2

OBJECTIVE 1

Choose the word or phrase to complete statements about livestock diseases and parasites.

Optional Activities/ Resources
- Share any experiences that you have relating to diseases, parasites, or disease/parasite prevention with the class.
- Talk with a vet or a stock manager about prevention programs.
- Visit a farm to identify signs of good health and observe preventive measures.

Start your discussion with the question, "Why is it important to recognize diseases and parasites?"

WORDS YOU SHOULD KNOW	
disease	condition apart from normal that prevents normal activity or performance of vital functions
host	any animal that serves as a residence for a parasite
parasite	organism that lives in or on a host animal and obtains food from the host

The costs of disease and parasites can be significant. The use of cost-effective preventive measures will directly affect profitability.

- **The costs due to disease and parasites include:**
  - death
  - medication
  - poor growth
  - poor feed conversion
  - increased overhead
  - long reproductive interval

In order to properly identify at-risk animals, stock managers must be able to recognize signs of good health.

- **Signs of good health include:**
  - contentment
  - alertness

- eating with relish
- sleek coat
- pliable, elastic skin
- normal feces and urine
- bright eyes and pink eye membranes
- consistent social behavior
- appropriate weight

- **Vital statistics:**

Animal	Average Rectal Temperature (degrees F.)	Normal Pulse Rate (beats/min)	Normal Respiration Rate (breaths\min)
Cattle	101.5°	60-70	10-30
Sheep	102.3°	70-80	12-20
Swine	102.6°	60-80	8-13
Poultry	106.0°	200-400	15-36

Stock managers should use preventive measures to control parasites and diseases.

☛ **NOTE:** An appropriate preventive program should be made with the assistance of a qualified vet.

- **Preventive measures include:**
  - immunization (targets diseases)
  - insecticides (targets parasites)
  - proper housing and ventilation (targets both diseases and parasites)
  - proper manure disposal (targets both diseases and parasites)
  - proper pasture rotation (targets both diseases and parasites)

- proper carcass disposal (targets both diseases and parasites)
- routine physical examinations (targets both diseases and parasites)
- accurate record keeping (targets both diseases and parasites)

OBJECTIVE 2

Arrange in order the life cycle stages of an internal parasite.

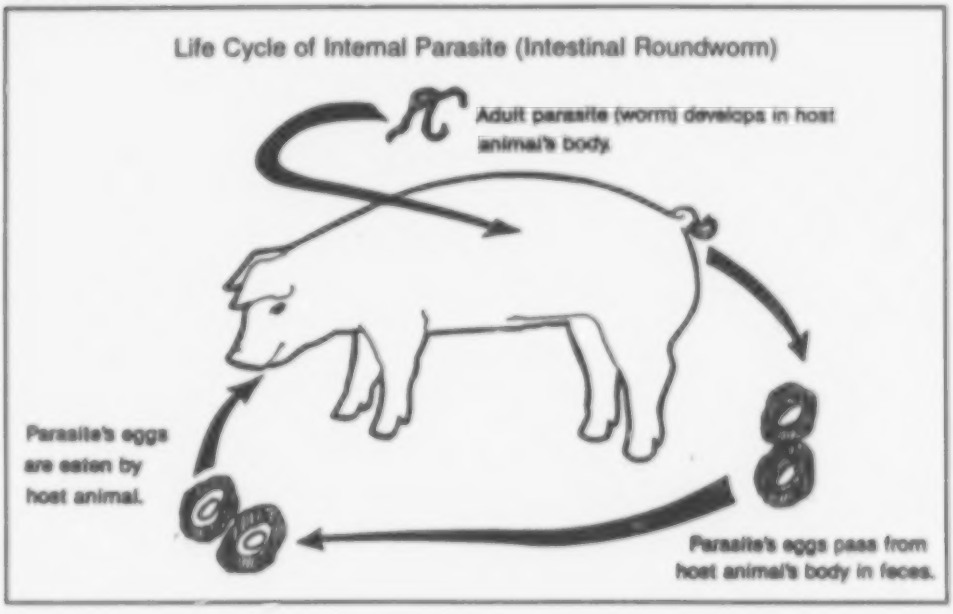
Required Activities/Resources
- Transparency Master 1

Optional Activities/Resources
- Research the life cycle of internal parasites not covered in class.

☞ You will see a transparency showing the life cycle of an internal parasite.

WORDS YOU SHOULD KNOW	
internal parasite	organism that lives part of its life cycle inside a host animal's body
life cycle	series of changes through which an organism passes during its life

FIGURE 1


Life Cycle of Internal Parasite (Intestinal Roundworm)
Adult parasite (worm) develops in host animal's body.
Parasite's eggs are eaten by host animal.
Parasite's eggs pass from host animal's body in feces.

☞ **NOTE:** The three primary areas where internal parasites attach to a host are the digestive tract, the lungs, and the liver. The life cycle of parasites that settle in the lungs and the liver is similar to the life cycle of the intestinal roundworm.

- **Stages in the life cycle of an internal parasite:**

  1. The parasite (intestinal roundworm) matures in the host's intestinal tract.
  2. The parasite lays its eggs in the host's intestinal tract.
  3. The eggs pass out of the host's body through its feces.
  4. Another animal ingests contaminated feedstuffs or water.
  5. The cycle begins again.

OBJECTIVE 3

Match common internal parasites to their descriptions.

Optional Activities/Resources
- Look up photos of animals infected with internal parasites.
- Talk with a vet abouts the internal parasites in your region.
- Obtain and observe specimens of internal parasites.

WORDS YOU SHOULD KNOW	
anemia	a condition where the blood is deficient in red blood cells, in hemoglobin, or in total volume
larva (plural: larvae)	the immature, wingless form that hatches from the egg of many insects

Common internal parasites include:

- **ascarid** – Ascarid are large, yellowish or pinkish roundworms found in swine. The migrating larvae produce liver damage and lung lesions resulting in pneumonia.
- **coccidia** – Coccidia are protozoan organisms which produce diarrhea and bloody feces in cattle, sheep, and poultry.
- **gastrointestinal worms** – Gastrointestinal worms are any of a number of species of worms found in the stomach, small intestine, and colon of cattle, sheep, swine, and poultry. The worms cause loss of weight, anemia, and/or diarrhea.
- **liver flukes** – Liver flukes are flattened, leaflike brown worms that are usually one inch long and cause severe liver damage, anemia, and loss of weight in cattle, sheep, swine, and poultry.
- **lungworms** – Lungworms are white, threadlike, 1½- to 3-inch worms found in the trachea and bronchi of cattle, sheep, and swine. The worms cause coughing, labored breathing, and loss of appetite.

- **stomach worms** – Stomach worms are threadlike, ¾-to-1½ inch worms primarily found in the stomach of sheep and to a lesser extent swine and cattle. The worms cause anemia, loss of weight, and weakness.

- **tapeworms** – Tapeworms are long, ribbonlike worms that infest the intestine of cattle, sheep, swine, and poultry. There are no marked or specific symptoms.

OBJECTIVE 4

Arrange in order the life cycle stages of external parasites.

Required Activities/Resources
– Transparency Masters 2 and 3

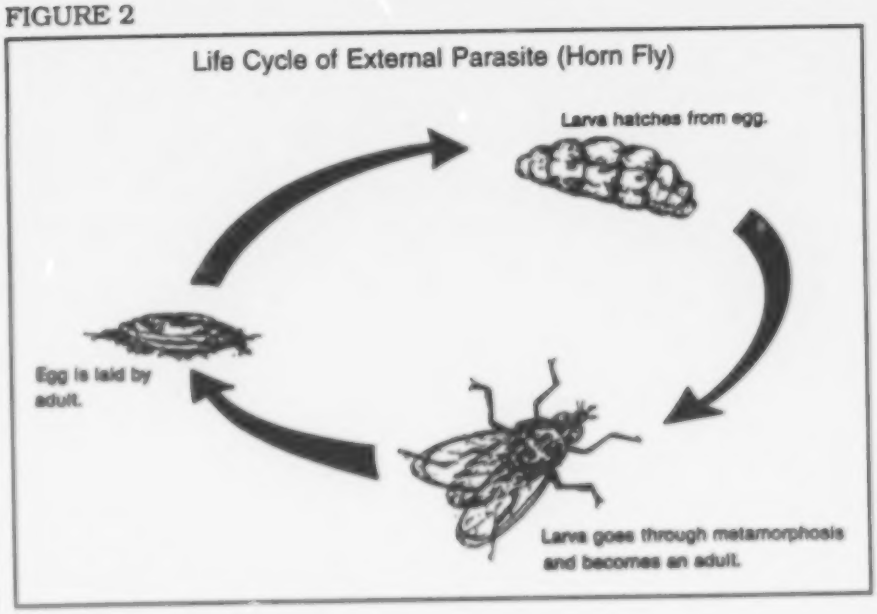
Optional Activities/Resources
– Research the life cycle of external parasites not covered in class.

You will see two transparencies showing the life cycle stages of external parasites.

WORDS YOU SHOULD KNOW	
external parasite	organism that lives on or under the host animal's skin
metamorphosis	change in form or structure of an organism that occurs after birth or hatching

The horn fly and the cattle grub represent typical external parasites. The horn fly represents the type of external parasite that remains outside of the host while the cattle grub and similar types of parasites reside inside the animal during the larva stage of development. (Figures 2 and 3)

FIGURE 2

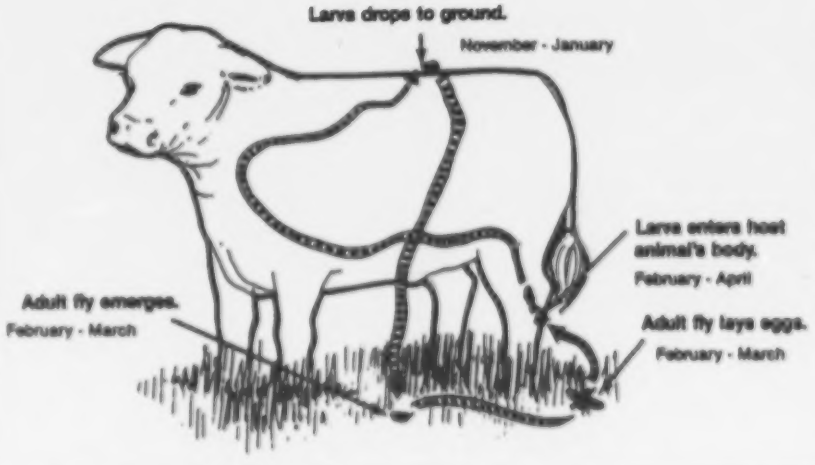

Life Cycle of External Parasite (Horn Fly)
Larva hatches from egg.
Egg is laid by adult.
Larva goes through metamorphosis and becomes an adult.

- **Stages in the life cycle of a horn fly:**

  1. The parasite (horn fly) feeds off the body of the host and deposits eggs in manure.
  2. The eggs hatch into larvae in the manure.
  3. The larva goes through a metamorphosis and becomes an adult horn fly that feeds on animals.
  4. The cycle begins again.

FIGURE 3

The Life Cycle of External Parasite (Heel Fly or Cattle Grub)



- **Stages in the life cycle of a heel fly or cattle grub:**

1. The parasite (heel fly or cattle grub) lays its eggs on the hair of the animal's hind legs, flanks, or sides.
2. The eggs hatch and the larvae burrow into the skin.
3. The larvae migrate through the body to the host's back, where they make a hole for breathing.
4. The mature larvae emerge through the hole and drop to the ground.
5. The adult fly emerges from the larvae.
6. The cycle begins again.

OBJECTIVE 5

Optional Activities/Resources
- Look up photos of animals infected with external parasites.
- Talk with a vet about the common external parasites that affect your region.
- Obtain and observe specimens of external parasites.
- Visit a farm and observe animal behavior under the influence of external parasites.

Match common external parasites to their descriptions.

Start your discussion with the question, "Why is it important to be able to recognize common external parasites?"

Common external parasites include:

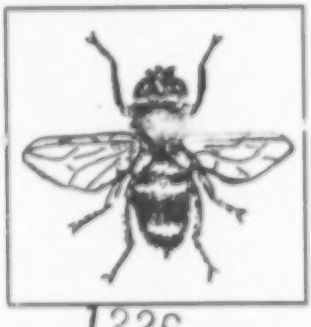
- **blowfly** – any of a number of species of flies, all of which breed in the flesh, causing maggots to spread over the host animal's body and feed on skin surface (found on cattle, sheep, swine, and poultry)

FIGURE 4

- **heel fly (cattle grub)** – fly that attacks the heels of cattle in early spring or summer, causing the host animal to run madly with its tail over its back in an attempt to escape. Larval stage causes swelling in back of host animal, usually from December to May (found on cattle)

NOTE: Treatment should be completed as soon as possible after heel fly activity before the larva migrates through the animal's body. The larvae can travel to the esophagus region (September – October); treatment during this period can cause swelling around the esophagus and can lead to death. If treated after the larvae migrate to the spinal area, treatment can cause paralysis.

FIGURE 5



- **horn fly** – Small fly often found resting at the base of the horn on cattle; the horn fly is one of the most numerous and worst annoyances of cattle, causing the tormented animal to refuse to graze during the day and to seek protection by hiding in dark buildings, brush, or tall grass.

FIGURE 6

- **horsefly** – biting fly that inflicts a painful bite and causes a heavily attacked animal to stop grazing (found on cattle)

FIGURE 7

- **louse** – small, flattened, wingless parasite that causes intense irritation and restlessness and may cause severe itching (found on cattle, sheep, swine, and poultry)

FIGURE 8

- **mite** – small parasite that causes mange, a marked irritation and crusting over of the skin accompanied by the formation of a thick, tough, wrinkled skin (found on cattle, sheep, swine, and poultry)

FIGURE 9

- **tick** – Any of several species that feed exclusively on blood; a heavy infestation will cause a host animal to lose weight and become anemic and lethargic. (found on cattle, sheep, swine, and poultry)

FIGURE 10

OBJECTIVE 6

Discuss parasite control.

Optional Activities/Resources
- Visit a farm with an effective parasite control program.
- Visit a farm with a poor parasite control program.
- Prepare a parasite control program for a hypothetical farm.

Start your discussion with the question, "Why is it important for a stock manager to understand the life cycle of parasites when considering parasite control?"

WORDS YOU SHOULD KNOW	
anthelmintics	drugs used to control internal parasites (worms)
insecticides	agents that destroy insects

The stock manager has three primary methods for combating parasites.

- **sanitation** – All parasites live a portion of their life cycle away from the host, providing an opportunity to control them with good sanitation practices. Proper sanitation is the most cost-effective way of reducing parasites. Practices include:
  - proper housing and ventilation
  - proper pasture rotation
  - proper manure disposal
  - proper carcass disposal
  - isolation of contaminated stock
- **anthelmintics** – A wide range of anthelmintics is available to treat internal parasites. Anthelmintics should not be used as the primary method of parasite control and should not be used without consulting a vet.
- **insecticides** – Insecticides can be effectively used to reduce the spreading of external parasites. Consult a vet before using insecticides.

OBJECTIVE 7

Complete Assignment Sheet 1.

OBJECTIVE 8

Optional Activities/Resources
- Look up photos of animals with infectious diseases.
- Share your experiences with infectious diseases in animals or humans.
- Talk with a vet about the infectious diseases that affect your region.

Match common infectious diseases to their descriptions.

Start your discussion with the question, "Why is it important to be able to recognize common infectious diseases?"

WORDS YOU SHOULD KNOW	
abortion	expulsion of a dead or immature fetus
bacteria	one-celled microorganism that may be harmful and can be seen with a microscope
contagious	communicable by contact
infection	entry and development of a pathogen in or on an animal's body
infectious disease	disease resulting from infection caused by a pathogen; may or may not be contagious
metabolic derangement	imbalance of vital organs in an animal's body
mortality rate	the frequency of death in proportion to the total number of animals
virus	submicroscopic organism or agent that causes disease

Common infectious disease include:

- **aspergillosis** (brooder pneumonia) – Brooder pneumonia is caused by a fungus that affects poultry. Symptoms include loss of appetite, gasping, and loss of weight.
- **atrophic rhinitis** – Atrophic rhinitis is a bacterial infection usually affecting young swine under 80 pounds. Symptoms include persistent sneezing and a snout that begins to wrinkle, bulge, and thicken when the pig is from 4 to 8 weeks old.
- **avian influenza** – Avian influenza is a viral disease that affects poultry. Symptoms include coughing, sneezing, and loss of weight.
- **avian pox** (fowl pox) – Fowl pox is viral infection that affects poultry. Symptoms include wartlike scabs around the head and comb and yellow cankers in the mouth and eyes.

- **blackleg** – Blackleg is a very infectious, highly fatal bacterial disease affecting young cattle and sheep. Symptoms in cattle include lameness and swelling, high fever, and stiffness. Symptoms in sheep include swelling in the region of a recent wound from shearing, castrating, docking, or bruising.

- **botulism** – Botulism is caused by poultry eating decayed material which contains bacterial toxins. Symptoms include weakness, trembling, paralysis, loose feathers, and closed eyes.

- **bovine rhinotracheitis** (red nose) – Red nose is a viral disease that affects cattle. Symptoms include going off feed and losing weight, coughing, pain in swallowing, slobbering, and nasal discharge.

- **bronchitis** – Bronchitis is a viral disease that affects poultry. Symptoms include difficult breathing, sneezing, gasping, nasal discharge, reduced egg production, loss of weight, and death.

- **brucellosis** (Bang's disease) – Bang's disease is a serious and widespread bacterial disease affecting cattle, swine, and rarely sheep. The most characteristic symptom is abortion and retained placenta.

- **bursal disease** (Gumboro) – Gumboro is a viral disease that affects young poultry. Symptoms include fever, ruffled feathers, loss of appetite, difficulty in defecation, slight tremors, dehydration, and unsteady movement.

- **coliform infections** (colibacillosis) – Coliform infections affect poultry. They are caused by various strains of bacteria. Symptoms include fever, ruffled feathers, listlessness, difficulty in breathing, and diarrhea.

- **coryza** – Coryza is a bacterial disease that affects older poultry. Symptoms include swelling around the eyes and wattles, nasal discharge, swollen sinuses, and reduced egg production.

- **enterotoxemia** – A condition that results when the bacterial population in the gut changes due to change in feed, failure to feed properly, or environmental stress. Symptoms are acute diarrhea, abdominal pain, and convulsions; results in death.

- **erysipelas** – Erysipelas is a bacterial disease that usually affects young swine. Symptoms include high fever; edema of the nose, ears, and limbs; and possibly purplish patches under the swine's belly.

- **foot rot** – Foot rot is a disease that affects cattle, sheep, and swine. Symptoms include lameness and a hoof infection with a characteristic foul odor.

- **fowl cholera** – Fowl cholera is caused by bacteria and affects primarily chicken broiler breeders. Symptoms include nasal discharge, swelling of the sinus, and inflammation of the eye.

- **leptospirosis** – Leptospirosis is a bacterial disease that affects cattle, sheep, and swine. The symptoms, which are usually mild, include fever, poor appetite, abortion, bloody urine, anemia, and ropy milk.

- **mastitis** – Mastitis is a bacterial infection affecting cattle, sheep, and swine. In acute form, the udder is hot, very hard, and tender. Other symptoms are elevated temperature, loss of appetite, awkward movement (due to the tenderness of the udder), and greatly reduced milk production.

- **mycoplasmosis** – Mycoplasmosis is a bacterial infection that affects poultry. Symptoms include nasal discharge, coughing, sneezing, loss of weight, swelling below the eyes, and reduced egg production.

- **omphalitis** – Omphalitis is a bacterial disease that affects young poultry. Symptoms include loss of appetite, diarrhea, drowsiness, and death.

- **pinkeye** – Pinkeye is a bacterial or viral eye ailment that affects cattle and sheep. The symptoms include liberal flow of tears, a tendency to keep the eyes closed, and a redness and swelling of the lining membranes of the eyelids.

- **pneumonia** – Pneumonia is an inflammation of the lungs that has many causes and affects all animals. Symptoms include quick, shallow respiration, crackling noises with breathing, and elevated temperature.

- **rabies** – Rabies is a fatal viral infection that has been seen with growing frequency in domestic cattle, sheep, and swine. Symptoms include loss of appetite, anxiety, madness, excitability, inability to swallow, and violent butting of the head.

- **salmonella and paracolon** – Salmonella and paracolon represent a number of bacterial infections that affect cattle, sheep, swine, and poultry. Symptoms vary depending on the pathogen but may include diarrhea, droopiness, chilling, loss of appetite, thirst, and death.

- **shipping fever** – Shipping fever is a bacterial or viral disease that affects cattle and sheep. The symptoms develop rapidly and last for a week or less. Symptoms include fever, discharge from eyes and nose, difficult breathing, and a hacking cough.

- **swine influenza** – Swine influenza is a viral disease that affects swine. The symptoms appear suddenly. They include high fever, loss of appetite, cough, and discharge from the eyes and nose.

- **transmissible gastroenteritis (TGE)** – TGE is a viral infection that affects swine and is most severe in young animals, where the mortality rate approaches 100%. The mortality rate decreases with age, almost never causing death in adult swine. Symptoms include scouring (in all cases) and vomiting (in some cases).

- **vibriosis** – Vibriosis is a bacterial disease that affects cattle and sheep. Symptoms include many abortions among ewes, especially during the last four to six weeks of pregnancy, and abortion among cattle during the middle third of pregnancy.

- **warts** – Warts are caused by a virus. They are usually seen on cattle and may affect other animals. The symptoms include growths that may appear anywhere on the body and range in size from very small to very large.

OBJECTIVE 9

Optional Activities/ Resources
- Look up pictures of animals with noninfectious diseases.
- Share your experiences with noninfectious disease in animals or humans.
- Talk with a vet about the noninfectious diseases that affect your region.
- Visit a farm or a veterinary clinic and observe animals suffering from disease.

Match common noninfectious diseases to their descriptions.

Many noninfectious diseases could be classified as nutritional diseases because they are the result of nutritional deficiencies that show up as a problem in one of the body systems. Start your discussion with the question, "Why is it important to recognize common noninfectious diseases?"

WORDS YOU SHOULD KNOW	
noninfectious disease	disease not due to infection by a pathogen, but resulting from physical or chemical agents or metabolic derangement
ruminant	an animal having a stomach divided into four compartments; includes cattle, sheep, goats, deer, buffalo

- **anemia, nutritional** – Nutritional anemia, caused by an iron deficiency, affects all farm animals. Symptoms include loss of appetite, progressive emaciation, and death.
- **bloat** – Bloat is a nutritional disease affecting all ruminants and caused by an accumulation of gas in the rumen (the first and largest compartment of the ruminant stomach).
  - **frothy bloat** – Frothy bloat is caused by a high-concentrate, low-roughage diet which produces trapped fermented gas. Symptoms include distention of the paunch, protrusion of the anus, respiratory distress, and struggling; may result in death if not treated.
  - **free gas bloat** – Free gas bloat results from activities that cause an accumulation of gas in the rumin, such as lying too long on the side.
- **founder (laminitis)** – Founder is a nutritional disease generally caused by overeating (grain, lush legumes, or grass) or overdrinking that affects cattle and sheep. Symptoms include fever, extreme pain, reluctance to move, and abnormal hoof growth.
- **milk fever (hypocalcemia)** – Milk fever is a nutritional disease caused by low blood calcium that affects sheep (to a lesser extent) and cattle, usually high-producing cows after parturition. The symptoms commonly develop within three days of parturition but may occur at other times. Symptoms include loss of appetite, constipation, general depression followed by nervousness, and finally, collapse.

- **scours** – Scours is a bacterial infection that affects young cattle and swine that have been weaned early. In cattle, calves nursed on mother's milk get antibodies which help prevent scours. In swine, the digestive tract of a young pig is immature, resulting in poor feed conversion, and making the pig susceptible to scours. Symptoms include cold, clammy skin; weakness; severe depression; and a watery, whitish or yellow, foul-smelling diarrhea.

OBJECTIVE 10

Discuss disease prevention.

Optional Activities/ Resources
- Share your experience with disease prevention program.
- Talk with a vet about disease prevention.
- Visit a farm that follows a strong disease prevention program.
- Visit a farm that follows a weak disease prevention program.
- Prepare a disease prevention program for a hypothetical farm.

Start your discussion with the question, "What are the short-term and long-term effects of practicing disease prevention?"

WORDS YOU SHOULD KNOW	
quarantine	to physically isolate stock for the purpose of preventing the spread of disease
vaccine	a drug used to increase immunity to a particular disease

The stock manager, with a veterinarian's guidance, should develop a specific disease prevention program for the stock. Prevention should focus on minimizing the spread of disease once a disease infests some of the stock. Also, care should be taken to reduce the likelihood of bringing diseased animals onto the farm.

- **Proper sanitation techniques** are the most cost-effective method for reducing the spread of disease. You should have procedures for proper:
  - disposal of carcasses
  - disposal of manure
  - pasture rotation
  - stock nutrition
  - eradication of pests, such as rats and mice
- **Quarantine animals** to:
  - insure that new, possibly diseased, stock does not contaminate existing stock

- isolate and treat diseased stock

- **Vaccinate stock** against any on-farm diseases. A vet should be contacted prior to the use of vaccines.

  ☛ **NOTE:** Discuss the use of all medications and drugs with your veterinarian. Misuse may injure or kill stock.

OBJECTIVE 11

Complete Assignment Sheet 2.

ASSIGNMENT SHEET 1	*LIVESTOCK DISEASES AND PARASITES*	**C-2**

Name _____ Score _____

OBJECTIVE 7

Determine prevention and controls for common parasites.

INTRODUCTION

To properly care for your livestock and maximize your profits, you must be able to recognize the symptoms of parasite infestation and you must be familiar with the various preventions and controls used to stop the spread of parasites.

You will determine prevention and controls for common parasites.

INSTRUCTIONS

Answer the following questions after studying the tables on internal and external parasites found at the end of this assignment sheet.

Reading Comprehension
- Gain factual information

Functional Reading
- Interpret graphics and symbols

1. a. What external parasite causes loss of weight, anemia, and lethargy in cattle, sheep, and poultry?

   _____

   b. What methods are used to prevent and control this parasite?

   _____

   _____

Life Science
- Investigate health issues

2. a. What external parasite causes infected wounds, soiled hair or fleece, weakness and fever in all farm animals?

   _____

   b. What methods are used to prevent and control this parasite?

   _____

   _____

3. a. What internal parasite causes diarrhea, bloody feces, and weakness in cattle, sheep, and poultry?

_____

b. What methods are used to prevent and control this parasite?

_____

_____

4. a. What internal parasite causes coughing, labored breathing, and loss of appetite in cattle, sheep, and swine?

_____

b. What methods are used to prevent and control this parasite?

_____

_____

5. a. What external parasite causes intense irritation, restlessness, severe itching, and may cause anemia in all farm animals?

_____

b. What methods are used to prevent and control this parasite?

_____

_____

6. a. What internal parasite causes anemia, loss of weight, and liver damage in cattle, sheep, poultry, and swine?

_____

b. What methods are used to prevent and control this parasite?

_____

_____

7. a. What external parasite affects cattle, attacking the heels during spring or summer and causing the animal to run madly with its tail over its back?

_____

b. What methods are used to prevent and control this parasite?

_____

_____

8. a. What internal parasite causes coughing and hard breathing in swine?

_____

b. What methods are used to prevent and control this parasite?

_____

_____

9. a. What internal parasite causes anemia, loss of weight, and weakness in swine, cattle, and sheep?

_____

b. What methods are used to prevent and control this parasite?

_____

_____

10. a. What external parasite makes cattle seek protection by hiding in buildings, brush, or tall grass?

_____

b. What methods are used to prevent and control this parasite?

_____

_____

11. a. What internal parasite causes loss of weight, poor rate of gain, anemia, and diarrhea in cattle, sheep, swine, and poultry?

_____

b. What methods are used to prevent and control this parasite?

_____

_____

12. a. What external parasite causes irritation and restlessness in cattle?

_____

b. What methods are used to prevent and control this parasite?

_____

_____

13. a. What external parasite causes irritation and crusting over of skin in all farm animals?

_____

b. What methods are used to prevent and control this parasite?

_____

_____

Table 1: Common internal parasites, symptoms, preventions and controls

Parasite	Species affected	Symptoms	Preventions and controls
Ascarid	Swine	Coughing and hard breathing; young pigs become unthrifty and stunted; liver damage	Clean farrowing quarters; wash sows before farrowing; place sows on clean pasture after farrowing; use parasiticide
Coccidia	Cattle Sheep Poultry Swine	Diarrhea, bloody feces, weakness	Avoid contaminated feed and water; keep feeders and water tanks sanitary; isolate affected animals; consult veterinarian; use coccidiastats
Gastro-intestinal worms	Cattle Sheep Poultry Swine	Loss of weight, poor rate of gain, anemia, diarrhea	Rotate pastures; isolate calves and lambs from adult animals; keep feeders and water tanks sanitary; use parasiticides
Liver flukes	Cattle Sheep Poultry Swine	Anemia, loss of weight, liver damage	Avoid wet pastures; use drench of flukacide
Lungworms	Cattle, especially calves Sheep Swine	Coughing, labored breathing, loss of appetite; young animals become stunted and unthrifty	Practice good sanitation; do not spread infested manure on pasture; use parasiticide
Stomach worms	Cattle Sheep Swine	Anemia, loss of weight, and weakness	Practice pasture rotation; drench with parasiticide
Tapeworms	Cattle Sheep Poultry Swine	There are no marked or specific symptoms; worm sections may be visible in feces	Practice pasture rotation; use parasiticide

Table 2: Common external parasites, symptoms, preventions and controls

Parasite	Species affected	Symptoms	Preventions and controls
Blowfly	All farm animals	Infected wounds, soiled hair or fleece, weakness, fever	Use proper procedure for destroying dead animals; use traps, poisoned baits, and repellents
Heel Fly (Cattle Grub)	Cattle	Grub (larva) causes swelling in backs of animals; occurs from December to May; adult attacks heels of cattle in early spring or summer, causing the afflicted animal to run madly with its tail over its back	Control flies between June and October; use systemic grub-control insecticide, but not after October 15
Horn Fly	Cattle	Tormented animal refuses to graze during day; animal seeks protection by hiding in buildings, brush, or tall grass	Remove manure from around barn; spray animals frequently from early May until frost; use appropriate parasiticide
Horsefly	Cattle	Irritation, restlessness, loss of condition as heavily attacked animal will stop grazing	Keep animals from heavy brush areas; no totally effective spray is available, but frequent spraying for flies helps from May until frost; use Pyrethrins
Louse	All farm animals	Intense irritation, restlessness, severe itching; may cause animal to become anemic	Spray frequently from October until spring; use Co-Ral, Malathion, or other appropriate parasiticide
Mite	All farm animals	Marked irritation and crusting over of skin accompanied by formation of thick, tough, wrinkled skin	Spray or dip animal with appropriate insecticide
Tick	Cattle Sheep Poultry Swine	Loss of weight; anemia; lethargy	Spray or dust frequently; use parasiticide

ASSIGNMENT SHEET 2	*LIVESTOCK DISEASES AND PARASITES*	**C-2**

Name _____ Score _____

OBJECTIVE 11

Determine common diseases, treatments, and preventive measures for cattle, sheep, swine, and poultry.

INTRODUCTION

To properly care for your livestock and maximize your profits, you must be able to recognize the symptoms of common infectious and noninfectious diseases and you must be familiar with the various preventions and controls to stop the spread of diseases.

You will determine prevention and controls for common infectious and noninfectious diseases in Part 1. In Part 2, you will prepare a table (similar to the Tables 2 and 3) for a disease assigned by your instructor.

INSTRUCTIONS

Reading Comprehension
- Gain factual information

Research and Reference
- Select useful resources
- Locate resources

Functional Reading
- Interpret graphics and symbols

Life Science
- Investigate health issues

Part 1:

Answer the following questions after studying Tables 3 and 4 on common infectious and noninfectious diseases found at the end of this Assignment Sheet.

1. a. What disease causes high fever; quick, shallow respiration; and cracking noises with breathing in all animals?

   _____

   b. What methods are used to treat and control this disease?

   _____

   _____

2. a. What disease causes wartlike scabs around a chicken's head and comb?

   _____

   b. What methods are used to treat and control this disease?

   _____

   _____

3. a. What disease causes marked scouring in all cases and vomiting in some cases, normal body temperature, and inflamed stomach and intestines in swine?

_____

b. What methods are used to treat and control this disease?

_____

_____

4. a. What disease causes watering and squinting of the eye and swelling of the lining membrane of the eyelid in cattle and sheep?

_____

b. What methods are used to treat and control this disease?

_____

_____

5. a. What disease causes abortion and retained placenta in cattle, sheep, and swine?

_____

b. What methods are used to treat and control this disease?

_____

_____

6. a. What disease causes an enlarged paunch on the left side of the hipbone in all ruminants?

_____

b. What methods are used to treat and control this disease?

_____

_____

7. a. What disease causes weakness, trembling, paralysis, loose feathers, and closed eyes in poultry?

_____

b. What methods are used to treat and control this disease?

_____

_____

8. a. What disease causes lameness, followed by a hoof infection in cattle, swine, and sheep?

_____

b. What methods are used to treat and control this disease?

_____

_____

9. a. What disease causes loss of appetite, constipation, and general depression in sheep and cattle, primarily high-producing cows after calving?

_____

b. What methods are used to treat and control this disease?

_____

_____

10. a. What disease causes many abortions in sheep and cattle?

_____

b. What methods are used to treat and control this disease?

_____

11. a. What poultry disease causes fever, ruffled feathers, loss of appetite, difficulty in defecation, and slight tremors?

_____

b. What methods are used to treat and control this disease?

_____

_____

12. a. What disease causes acute diarrhea, abdominal pain, and convulsions in cattle, sheep, and swine?

_____

b. What methods are used to treat and control this disease?

_____

_____

13. a. What disease causes cattle to go off of feed, lose weight, cough, and show pain when swallowing?

_____

b. What methods are used to treat and control this disease?

_____

_____

14. a. What swine disease causes a high fever, loss of appetite, cough, and discharge from nose and eyes?

_____

b. What methods are used to treat and control this disease?

_____

_____

15. a. What nutritional disease causes loss of appetite, progressive emaciation, and death in all animals?

_____

b. What methods are used to treat and control this disease?

_____

_____

16. a. What disease causes your chickens loss of appetite, diarrhea, drowsiness, and death?

_____

b. What methods are used to treat and control this disease?

_____

_____

17. a. What disease causes persistent sneezing and a snout that begins to wrinkle, bulge, and thicken in swine?

_____

b. What methods are used to treat and control this disease?

_____

_____

INSTRUCTIONS

Part 2:

Your instructor will assign you one or more of the diseases listed below to research. Prepare a table similar to the tables at the end of this Assignment Sheet. Your instructor will compile all of the students' tables and distribute a copy to you.

☛ **NOTE:** Your instructor may add or delete items from this list.

INFECTIOUS DISEASES:

1. African sleeping sickness
2. bacillary hemoglobinuria
3. Black disease
4. omphalitis
5. calf diphtheria
6. cholera, hog
7. edema
8. enzootic abortion
9. foot-and-mouth
10. Johne's disease
11. lumpy jaw
12. metritis
13. pleuropneumonia
14. polyarthritis
15. pseudorabies
16. rabies
17. ram epididymitis
18. scrapie
19. smedi
20. streptococcal
21. tuberculosis
22. vaginitis
23. winter dysentery
24. avian leukosis
25. bluecomb
26. laryngotracheitis
27. Newcastle disease
28. anthrax
29. bighead
30. bluetongue
31. bovine virus diarrhea
32. caseous lymphadenitis
33. cowpox
34. entropion
35. fescue foot
36. foothill abortion
37. listeriosis
38. Lyme disease
39. naval infection
40. polio
41. porcine parvovirus
42. Q fever
43. aortic rupture
44. rotaviral diarrhea
45. sheath-rot
46. sore mouth
47. tetanus
48. tularemia
49. vesicular exanthema
50. arthritis
51. avian vibrionic hepatitis
52. epidemic tremor
53. necrotic enteritis
54. bovine pulmonary emphysema

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NONINFECTIOUS DISEASES:

1. acidosis
2. cancer eye
3. gossypol
4. hypoglycemia
5. ketosis
6. night blindness
7. parakeratosis
8. prussic acid poisoning
9. rickets
10. sweet clover disease
11. weak calf syndrome
12. crooked calves
13. downer cow syndrome
14. grass tetany
15. iodine deficiency
16. liver abscesses
17. osteomalacia
18. photosensitization
19. pulmonary emphysema
20. salt deficiency
21. urinary calculi
22. white muscle disease

Table 3: Infectious Diseases

Disease	Species affected	Symptoms	Treatment and control
Aspergillosis (brooder pneumonia)	Poultry	Loss of appetite, gasping, and loss of weight	Use litter that is free of mold
Atrophic rhinitis	Young pigs under 80 pounds	Persistent sneezing and snout that begins to wrinkle, bulge, and thicken when pig is from four to eight weeks old	Select breeding stock from herds known to be clean; use clean farrowing quarters; treat with sulfonamide drugs
Avian influenza	Poultry	Coughing, sneezing, and loss of weight	Antibiotics
Avian pox (fowl pox)	Poultry	Wartlike scabs around the head and comb and yellow cankers in the mouth and eyes	Prevented by vaccination
Blackleg	Young cattle Sheep	Cattle: Sudden sickness or death; high fever; lameness; stiffness; swelling of muscles; crackling sound heard when areas are touched Sheep: Swellings in region of recent wound from shearing, castrating, docking, bruising from fighting, etc.	Burn or bury carcasses; vaccinate sheep two to four weeks before shearing, castrating, and docking; vaccinate all calves at three to four months of age
Botulism	Poultry	Weakness, trembling, paralysis, loose feathers, and closed eyes	Eliminate sources of decayed material, contaminated water is often the source; antitoxin may be used to save a valuable bird
Bovine rhino-tracheitis (Red nose)	Cattle	Animal goes off feed; weight loss; coughing; slobbering; nasal discharge; may show pain in swallowing	Practice good sanitation; isolate infected animal; vaccinate; no specific treatment, but give sulfonamides and antibiotics to combat secondary infections
Bronchitis	Poultry	Difficult breathing, sneezing, gasping, nasal discharge, reduced egg production, loss of weight, and death	Vaccination, isolation of stock, and sanitation

Disease	Species affected	Symptoms	Treatment and control
Brucellosis (Bang's disease)	Cattle Swine Sheep, rarely	Abortion; retained placenta	No treatment known; slaughter infected animal; vaccinate calves; thoroughly clean areas exposed to infection
Bursal disease (Gumboro)	Poultry	Fever, ruffled feathers, loss of appetite, difficulty in defecation, slight tremors, dehydration, and unsteady movement	Vaccination; there is no treatment
Coliform infections (colibacillosis)	Poultry	Fever, ruffled feathers, listlessness, difficulty in breathing, and diarrhea	Sanitation, fumigation of hatching eggs, and reduction of stress
Coryza	Poultry	Swelling around the eyes and wattles, nasal discharge, swollen sinuses, and reduced egg production	Good sanitation; drugs are used in treatment
Enterotoxemia	Cattle Sheep Poultry Swine	Acute diarrhea, abdominal pain, and convulsions	Immunization and sanitation; treatment is usually ineffective because of the severity of the onset of the disease
Erysipelas	Swine	Acute form; high fever; edema of nose, ears, and limbs; possible purplish patches under belly	Isolate sick animal; clean and disinfect pen; give antibiotics; vaccinate once or twice a year
Foot rot	Cattle Sheep Swine	Lameness, followed by hoof infection; characteristic foul odor	Eliminate source of foot injuries; move affected animal to dry quarters; trim inflamed foot and wash with warm, soapy water; disinfect; give sulfa drugs and antibiotics; vaccinate to reduce incidence
Fowl cholera	Poultry	Nasal discharge, swelling of the sinus, and inflammation of the eye	Sanitation and vaccination; drugs used for treatment
Leptospirosis	Cattle Sheep Swine	Mild symptoms in most animals; poor growth in beef cattle; loss of production in dairy cows; abortion in swine	Perform blood test; vaccinate all animals; isolate new or sick animals; refer to vet for possible blood transfusions and appropriate antibiotics for infected animals

Disease	Species affected	Symptoms	Treatment and control
Mastitis	Cattle Sheep Swine	Acute form: Udder is hot, very hard, and tender; increase in temperature; milk flow is reduced and may become watery or lumpy Chronic form: Only symptom is thick or lumpy milk Sheep: Chronic discharge from teats; gangrene (blue bag)	Eliminate source of udder injury; provide clean bedding; treat with antibiotics
Mycoplasmosis	Poultry	Nasal discharge, coughing sneezing, loss of weight, swelling below the eyes, reduced egg production	Treat hatching eggs with antibiotic solution
Omphalitis	Poultry	Loss of appetite, diarrhea, drowsiness, and death	Isolation of flock; drugs used for treatment
Pinkeye	Cattle, mostly Herefords Sheep	Watering and squinting of eye; swelling of lining membrane of eyelid; blindness if condition is not treated	Isolate affected animal; treat with antibiotics; provide good nutrition, including vitamin A
Pneumonia	All animals	High fever; quick, shallow respiration; cracking noises with breathing; standing with legs wide apart	Isolate infected animals and treat with sulfa drugs and antibiotics; practice good, sound husbandry and provide good hygienic surroundings
Salmonella (and paracolon)	Cattle Sheep Swine Poultry	Symptoms vary depending on pathogen; may include diarrhea, droopiness, chilling, loss of appetite, thirst, and hacking cough	Secure disease-free poultry, treatment not very effective, recovered birds often become carriers
Shipping fever	Cattle Sheep, especially lambs	Environmental conditions creating stress cause high temperature, discharge from eyes and nose, hacking cough, difficulty in breathing; possibly a swelling in neck region	Provide good feeding and management; vaccinate three weeks before stressing cattle; isolate infected animals; treat with antibiotics
Swine influenza	Swine	High fever, loss of appetite, cough, discharge from nose and eyes; animal may sit up like a dog to facilitate breathing	Provide warm, clean, well-ventilated quarters and ample supply of fresh water; use antibiotics

Disease	Species affected	Symptoms	Treatment and control
Transmissible gastroenteritis (TGE)	Swine (especially severe in young animals)	Marked scouring in all cases and vomiting in some cases; normal body temperature; inflamed stomach and intestines	Move and scatter sows that have not farrowed; avoid continuous farrowing; isolate new additions to herd; practice good feeding and management; no effective treatment, but give antibiotics or sulfonamides to prevent secondary infection
Warts	Cattle, primarily; May affect other animals	Growths on skin varying from very small to large cauliflower-like growths weighing several pounds; may appear anywhere on body but are usually found on the teats or around the head	Isolate infected cattle; clean and disinfect pens; vaccinate or remove warts surgically
Vibriosis	Cattle Sheep	Many abortions among ewes, especially during last four to six weeks of pregnancy; abortion in middle third of pregnancy for cattle	Vaccinate two months before breeding animal; use antibiotics; allow sexual rest; practice good sanitation

Table 4: Noninfectious Diseases

Disease	Species affected	Symptoms	Treatment and control
Anemia, nutritional	All animals	Loss of appetite, progressive emaciation, and death	Provide sources of the nutrient
Bloat Free gas bloat Frothy bloat	All ruminants	Enlarged paunch on the left side in front of the hipbone, followed by distention of the right side; difficult breathing	Feed dry hay before putting the animal on green, lush pasture; change feed; treat affected animal by giving defoaming agents such as peanut oil, corn oil, or soybean oil by stomach tube; keep the animal on its feet and moving
Founder (laminitis)	Cattle Sheep	Extreme pain, fever, and reluctance to move; later followed by dropping of the hoof soles and abnormal hoof growth	Avoid overfeeding and overdrinking; destroy severe cases; stand the animal's feet in cold-water bath until a vet arrives
Milk fever (hypocalcemia)	Cattle, primarily high-producing cows after calving Sheep	Loss of appetite, constipation, general depression followed by nervousness, and finally collapse	Keep good supply of vitamins and minerals available; feed a high-phosphorous low-calcium diet during last ten to fourteen days of pregnancy; treat with injections of calcium glucose given intravenously
Scours	Calves Lambs Piglets	Cold, clammy skin; dehydration; weakness; severe depression; and a characteristic watery, whitish or yellow, foul-smelling diarrhea	Be sure animal nurses; wean at the proper time; give colostrum if animal does not nurse; treat with antibiotics or sulfa drugs; replace fluid loss

OBJECTIVE SHEET

NUTRITION, FEEDS, AND ADDITIVES

C-3

INTRODUCTION

Nutrition is important for a number of reasons. Feeding a balanced ration insures that your livestock will remain healthy and produce according to your expectations. Inadequate rations will result in loss of production, illness, and, in some cases, death. Feed costs represent a major expense in raising livestock, which means that feeding in excess will reduce the profits of your livestock operation. Livestock managers work hard to balance the nutritional needs of livestock and the cost of feed. Every well-run livestock operation makes nutrition a major health and business concern.

PREREQUISITE

NONE

FOCUS ASSIGNMENTS

Reading Comprehension
- Gain factual information
- Analyze cause and effect
- Draw conclusions

Language
- Use standard grammar, spelling, and capitalization
- State ideas clearly

Composition
- Use complete sentences

FOCUS ASSIGNMENTS	
PREREADING:	Read *Swine Nutrition* by William G. Luce and Charles V. Maxwell, OSU Extension Facts No. 3500.
WRITING:	Write a short essay (one paragraph to one page) about why proper swine nutrition is important for a profitable swine operation.

UNIT OBJECTIVE

After completing this unit, you will show the following competencies by mastering the activities on the Assignment and Job Sheets and by scoring at least 85% on the Written Test.

SPECIFIC OBJECTIVES

1. Choose the word or phrase to complete statements about basic principles of animal nutrition and health.

2. Arrange in order the digestive process of ruminants.

3. Arrange in order the digestive process of nonruminants.

4. Arrange in order the digestive process of poultry.

5. Choose the word or phrase to complete statements about nutrients, sources, and their actions on animal physiology.

6. Analyze nutritional deficiencies. (Assignment Sheet 1)

7. Define the categories of feed.

8. Select true statements about the composition of feeds.

9. State uses of common additives.

10. Compare the composition, nutrients, supplements, and additives in different commercial feeds. (Assignment Sheet 2)

11. List factors to consider when buying feed.

12. Compare the cost of feeds with specific additives. (Assignment Sheet 3)

13. Select true statements about proper feed storage and handling practices.

14. Design a feed storage area. (Assignment Sheet 4)

15. Discuss energy values.

16. Choose the word or phrase to complete statements about net-energy.

17. Select true statements about balanced rations.

18. Use the Pearson square to balance rations. (Assignment Sheet 5)

19. Determine proper nutrient and water requirements for livestock in various stages of production. (Assignment Sheet 6)

20. Use a computer program to balance rations. (Assignment Sheet 7)

21. Calculate balanced rations for livestock on a hypothetical farm. (Assignment Sheet 8)

22. Choose the word or phrase to complete statements about poultry feed.

23. Choose the word or phrase to complete statements about pasture requirements and grazing systems.

24. Identify pasture requirements. (Assignment Sheet 9)

25. Develop a grazing plan. (Assignment Sheet 10)

26. Analyze nutritional problems according to species. (Assignment Sheet 11)

INFORMATION SHEET	NUTRITION, FEEDS, AND ADDITIVES	C-3

OBJECTIVE 1

Optional Activities/ Resources
- Look at the cost of feeds and additives in your program and in students' projects.
- Look at the total amount of veterinary care and expenses required for your program and determine how much was related to nutrition.

Choose the word or phrase to complete statements about basic principles of animal nutrition and health.

WORDS YOU SHOULD KNOW	
balanced ration	ration that supplies all necessary nutrients in the proper amounts
digestion	the process of breaking down food into simple substances that can be absorbed into the bloodstream and used by the body cells
nutrient	class of food that aids in the support of life and becomes part of the body cells
ration	feed allowed an animal for a twenty-four hour period

For an animal's body structures and systems to function efficiently, you must provide proper nutrition. A comprehensive feeding program should be discussed with a veterinarian or a qualified animal nutritionist.

- Feed costs make up a significant portion of the cost of maintaining animals.
- The composition of the feed is determined by the needs of the animal. A dairy cow that is producing milk has different nutritional needs from a mature bull maintained for breeding.
- Proper nutrition is also required to maintain animal health. Animal managers must use balanced rations to insure that animals grow properly and remain healthy.
  - Improper feeding will keep an animal from gaining or maintaining its weight.
  - Improper feeding will weaken an animal's ability to fight parasites and diseases.

- Each nutrient has a specific function in the animal's body. Problems may occur when there is a deficiency of any one nutrient. Necessary nutrients include:

  NOTE: The function of each nutrient is discussed in objective 5.

  - water
  - protein
  - carbohydrates
  - fats
  - minerals
  - vitamins

OBJECTIVE 2

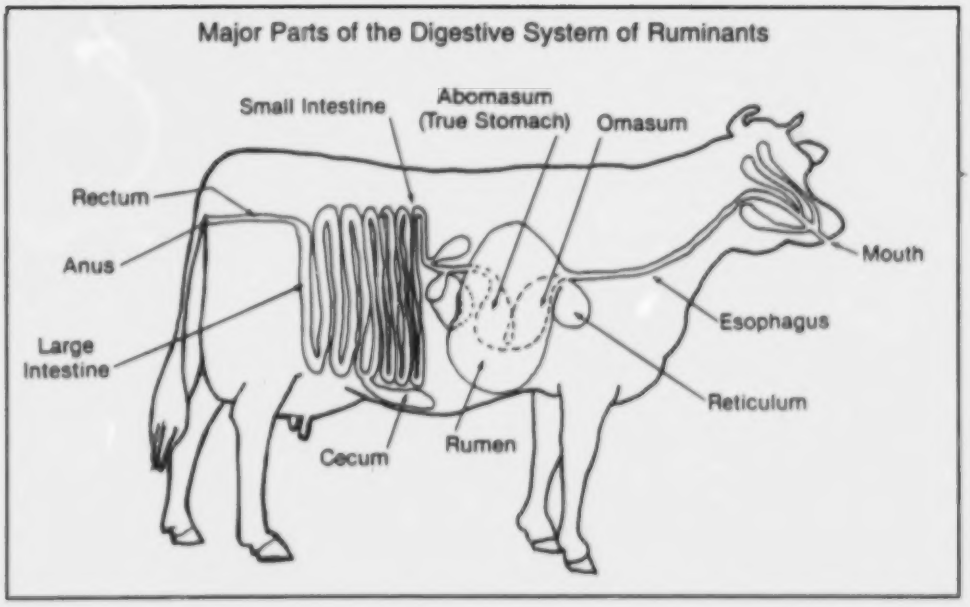
Arrange in order the digestive process of ruminants. (Figure 1)

Required Activities/ Resources
- Transparency Master 1

You will see a transparency of the digestive tract of a cow.

WORDS YOU SHOULD KNOW	
cud	the food regurgitated from the first stomach to the mouth of a ruminant and chewed again
bolus	a small round mass
digestive system	the parts of an animal's body that are involved in chewing and digesting food, moving digested food through the body, and absorbing the products of digestion
roughages	feeds that are high in fiber and low in digestible nutrients
ruminants	animals such as cattle, sheep, and goats with large, four-compartment stomachs containing a large population of microorganisms, giving them the capacity and means of processing and utilizing large quantities of bulky roughage

FIGURE 1



The major steps in the digestive process of ruminants:

1. The food is taken into the mouth and chewed just long enough to make swallowing possible.

2. The food moves down the esophagus to the rumen, where it is acted on by millions of microorganisms.

3. A portion of the food in the form of a bolus is forced from the rumen back into the mouth, where it is rechewed and reswallowed. (This is referred to as chewing the cud.)

4. The food returns to the rumen/reticulum for further storage and action by microorganisms.

5. The food moves to the omasum, where water is squeezed from the food.

   ☑ **NOTE:** The exact function of the omasum is not fully understood, but researchers think that it absorbs water and possibly grinds the food.

6. The food enters the abomasum (true stomach), where it is mixed with digestive juices.

7. The food moves to the small intestine, where the digestible portion is absorbed.

8. The undigested portion of the food moves to the large intestine, where it is formed into feces.

9. The feces is stored in the rectum until it is expelled through the anus.

OBJECTIVE 3

Required Activities/ Resources
- Transparency Master 2

Arrange in order the digestive process of nonruminants. (Figure 2)

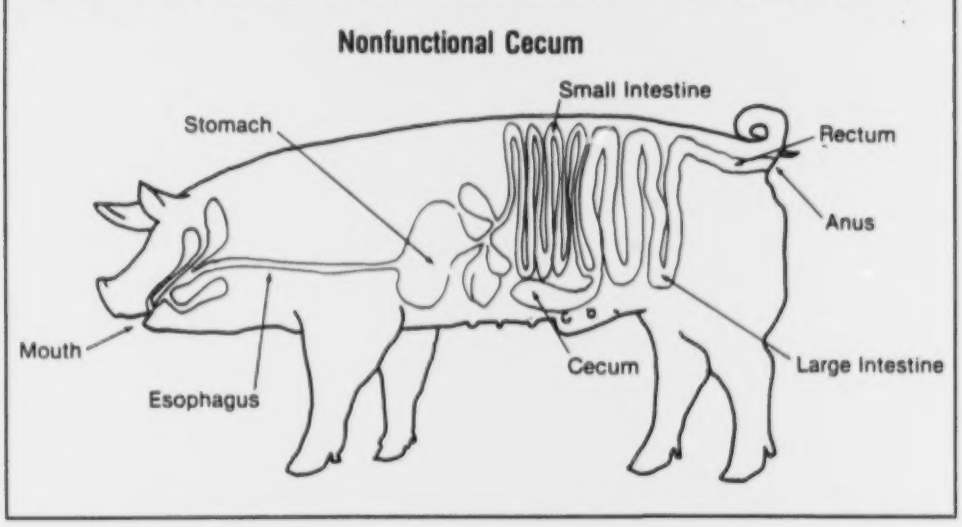
☞ You will see a transparency of a pig's digestive tract.

WORDS YOU SHOULD KNOW	
cecum	a large pouch at the forward part of the large intestine
functional cecum digestive system	a subdivision of nonruminant digestive systems found in animals such as horses, rabbits, and guinea pigs in which the cecum is relatively large and functional, increasing the animal's ability to digest the roughage in feeds
nonfunctional cecum digestive system	a subdivision of nonruminant digestive systems found in animals such as pigs, dogs, and humans in which the cecum is relatively small and has little function, limiting the animal's ability to digest the roughage in feeds
nonruminants	animals such as horses, pigs, chickens, and humans with relatively small and simple one-compartment stomachs containing limited microorganisms, making them better adapted to processing and utilizing concentrated feed such as grains and meat products

☑ **NOTE:** There are three subdivisions of digestive systems. The third is the avian digestive system in which special organs (crop and gizzard) soften, crush, and grind feed. The avian system will be discussed in objective 4.

FIGURE 2

Major Parts of the Digestive System of Nonruminants: Nonfunctional Cecum



The major steps in the digestive process of nonruminant functional and nonfunctional cecum systems:

1. The food is taken into the mouth, where it is chewed and mixed with saliva.
2. The food moves down the esophagus to the stomach, where it is churned and mixed with digestive juices.
3. The food moves into the small intestine, where most of the digestible portion is absorbed.
4. The food moves into the cecum.
   - In an animal with a functional cecum, some additional digestion and absorption takes place.
   - In an animal with a nonfunctional cecum, the food moves on through the digestive system.
5. The undigested portion of the food moves into the large intestine, where the water is absorbed and the rest is collected to form feces.
6. The feces is stored in the rectum until it is expelled through the anus.

OBJECTIVE 4

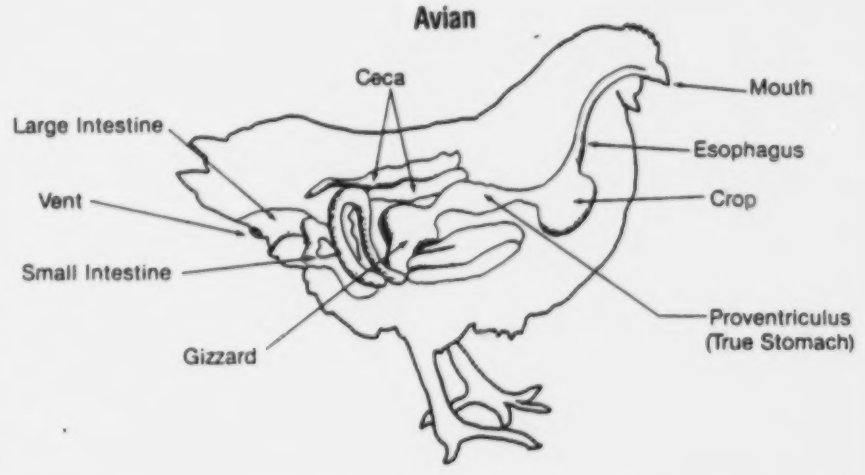
Arrange in order the digestive process of poultry. (Figure 3)

Required Activities/ Resources
- Transparency Master 3

You will see a transparency of the digestive tract of a chicken.

FIGURE 3

Major Parts of the Digestive Systems of Nonruminants: Avian



The major steps in the digestive process of poultry:

1. The food is taken into the mouth.
2. The food immediately moves down the esophagus to the crop, where it is stored and soaked.
3. The food moves to the proventriculus (true stomach), where it is mixed with digestive juices.
4. The food moves to the gizzard, where it is crushed and ground.
5. The food moves through the small intestine, where nutrients are absorbed.
6. The food moves through the ceca and the large intestine, where it is formed into feces.
7. The feces is expelled through the vent.

OBJECTIVE 5

Optional Activities/ Resources
- Read magazine articles and OSU Facts Sheets on nutrition and report to the rest of the class on your reading.
- Watch a video on nutrition.

Choose the word or phrase to complete statements about nutrients, sources, and their actions on animal physiology.

WORDS YOU SHOULD KNOW	
amino acid	an organic compound containing nitrogen; essential for growth and maintenance of cells

Nutrients and their basic functions:

- **water** – promotes the body's chemical reactions, regulates body temperature, and forms the basis of the body's lubricants

  ☞ **NOTE:** Water should be clean, fresh, and available at all times. Lactating sows, for instance, need 4 to 5 gallons of water per day.

- **protein** – supplies the amino acids necessary to build body tissues; the primary sources of protein are

  - plant protein – soybean meal, cottonseed meal, linseed meal, peanut meal, and sunflower-seed meal

    ☞ **NOTE:** Soybean meal is one of the highest-quality plant proteins because it contains most of the essential amino acids needed by animals.

  - animal protein – meat scraps, fish meal, and milk products

    ☞ **NOTE:** Animal-protein sources are generally regarded as being higher in quality than most plant proteins because they contain the essential amino acids in the proper balance. They are more expensive than plant proteins.

- **carbohydrates** – provide energy for muscle movement and produce body heat to help maintain body temperature

- **fats** – provide energy and fat-soluble vitamins

- **minerals** – provide material for growth of bones, teeth, and tissues; and regulate the body's vital chemical processes

  ☛ **NOTE:** There are known mineral deficiencies in the soils in certain areas of the United States. Consult your local feed supplier for deficiencies in your area.

  - Macro minerals are required in relatively large amounts and include:

calcium	potassium
phosphorus	chloride
sodium	sulfur

  - Micro minerals are required in relatively small amounts and include:

cobalt	manganese
copper	zinc
iodine	selenium

- **vitamins** – help in tooth and bone formation; help prevent infections; and are essential for normal body functions such as digestion, cell metabolism, growth, and reproduction

  - Vitamin requirements vary. Some animals are able to synthesize certain vitamins. The primary vitamins required by most farm animals include:

vitamin A	riboflavin (B-2)
vitamin D	thiamin (B-1)
vitamin E	vitamin B-6
vitamin K	vitamin B-12
biotin	vitamin C
folacin	niacin

OBJECTIVE 6

Complete Assignment Sheet 1.

OBJECTIVE 7

Define the categories of feed.

Optional Activities/ Resources
- Visit a local feed supplier to investigate the different categories of feed available.

Components of Feed

- **roughage** – feeds high in cellulose or fiber and relatively low in digestible nutrients

- **concentrates** – feeds low in fiber and relatively high in digestible nutrients

- **supplements** – "extras" like salt or mineral block that supply specific nutrients

- **additives** – compounds added to feed to preserve it or to alter animal metabolism

Types of Rations

- **maintenance ration** – supplies only those nutrients necessary to maintain an animal's normal body function

  ☞ **NOTE:** This type of ration is intended to maintain normal body weight. It does not provide nutrients needed for growing, fattening, production, reproduction, or work.

- **growing ration** – supplies nutrients above maintenance level, allowing an animal to build and expand body parts

  ☞ **NOTE:** Animals must have additional nutrients beyond the maintenance level in order for the body to grow and mature. Growing ration is usually fed to physically immature animals.

- **fattening ration** – supplies nutrients to produce fat after maintenance and growing requirements are met

  ☞ **NOTE:** Animals intended for slaughter need certain amounts of fat deposits in the meat to make it more desirable. Feeds high in carbohydrates and fats are used for fattening.

- **production ration** – supplies nutrients to produce such items as milk, eggs, or wool

- **reproduction ration** – supplies additional nutrients needed during breeding activity and pregnancy

- **work ration** – supplies additional nutrients needed by working animals

  ☞ **NOTE:** Animals intended for work have higher energy requirements than the maintenance ration can provide.

- **flushing ration** – given to females prior to breeding to increase body weight

  ☞ **NOTE:** Animals fed flushing rations release more eggs, come into heat more promptly, and have better conception rates. Sheep and swine have a 15 to 30% increase in offspring crops.

OBJECTIVE 8

Select true statements about the composition of feeds.

Optional Activities/ Resources
- Read OSU Facts Sheet F-3502, *Feedstuff Composition for Swine Rations.*
- Examine the ingredients in the feeds used in your program.

WORDS YOU SHOULD KNOW	
commercial ration	prepared feed, usually a balanced ration, that can be purchased for a specific purpose, such as to increase the amount of protein in an animal's diet

The following commercial rations are available:

- **creep feed** – additional feed for young animals that supplements nutrients provided by mother's milk
- **medicated feed** – any type of ration to which medicines or antibiotics have been added for disease prevention and treatment
- **cereal grains** – various grain concentrates that are used in rations

  EXAMPLES: corn, wheat, oats, barley, rice, and rye
- **protein supplement** – high-protein additives that are used to increase a ration's protein level

  EXAMPLES: soybean meal, cottonseed meal, linseed meal, tankage and meat scraps, and fish meals
- **feed additive** – general term for any component added to a ration for a specific purpose

  EXAMPLES: protein supplements, medications, tranquilizers, hormones, vitamins, minerals, and salt
- **blocks** – supplement that can be licked from a block; can be consumed at any time

  EXAMPLES: sulphur block, trace mineral block, salt block

OBJECTIVE 9

State uses of common additives.

Optional Activities/ Resources
- Watch a video on BST.
- Talk to a local livestock manager about the use of additives.

WORDS YOU SHOULD KNOW	
hormones	organic materials secreted by certain body tissues (such as the pituitary gland) which act at sites some distance away from the tissue of origin
urea	a synthetic nitrogen source
withdrawal period	the amount of time that an animal must be off the feed additive before slaughter

Regulation for the use of additives are found on feed labels. A withdrawal period is used to eliminate residues in animal tissue.

☞ **NOTE:** There are strict regulations for the use of additives. These regulations should be adhered to for the safety of the animal and the consumer. A veterinarian should be consulted when developing an additives program.

Common additives include:

- **antibiotics** – inhibit the growth of disease-causing bacteria

  ☞ **NOTE:** Antibiotic residues in meat, poultry, and dairy products can cause adverse reactions in humans who are allergic to the compounds.

- **chemicals** – certain chemicals influence animal performance

  - **copper sulfate** – improves growth responses and improves feed conversion; used in pig rations
  - **rumensin** (monensin) – improves feed efficiency for ruminant animals
  - **anthelmintics** (deworming agents) – control low-level internal parasites

    ☞ **NOTE:** Heavy infestations of parasites are treated differently. Consult a veterinarian for the proper procedures.

- **urea** – used as a protein (nitrogen) supplement
- **vitamins** – provide necessary nutrients for proper development and growth

- **hormones** – Natural and synthetic hormones have been used extensively in improving beef production; they are rarely used in swine and poultry production.

  ☛ **NOTE:** Some hormones are implanted behind the animal's ear. See Unit C-4 for additional information on hormone additives.

  - Melengestrol acetate (MGA), Synovex S, Synovex C, and Synovex H are examples of growth hormones that improve feed efficiency and increase the rate of gain.
  - BST (bovine somatotropin) is a growth hormone that has been found to increase milk production.

- **mineral supplements** – Mineral supplements are used to supplement nutritional needs.

  EXAMPLES: bone meal, calcium, cobalt, copper, iron, magnesium, phosphate, potassium, sodium, and zinc

OBJECTIVE 10

Complete Assignment Sheet 2.

OBJECTIVE 11

List factors to consider when buying feed.

Optional Activities/ Resources
- Visit a local feed supplier to investigate the types of feed available.

WORDS YOU SHOULD KNOW	
palatable	having a desirable taste

Most states have laws regulating the sale of commercial feed. Licenses are required for each brand of feed and the chemical composition of each brand is guaranteed. Feed tags are required by law and provide information on the ingredients and the chemical makeup of the feed.

Factors to consider when buying feed:

- **Type of livestock being fed**
- **Palatability**

- **Protein level**

  ☞ **NOTE:** Protein level is usually the most important consideration when purchasing feed. The protein level directly affects the price of feed.

- **Performance expected from your livestock**

  EXAMPLES: maintenance, growth, fattening, production, reproduction, and work

- **Quantity**

  ☞ **NOTE:** Old feed becomes stale and less palatable. Purchase only the amount of feed needed for a two- to three-week period.

- **Condition and size of your storage facility**

  ☞ **NOTE:** Storage facilities should be adequate to hold the quantity of feed purchased and should keep rats, mice, and birds out. Storage facilities are discussed in objective 14.

- **Price in relation to feeding value**

  ☞ **NOTE:** Lowest-priced feeds may not provide the best value because the quality may be poor.

- **Alternative feed sources**

  ☞ **NOTE:** Commercial feed sources are generally more expensive than farm-produced feed. Commercial feed should be used to supplement farm sources.

- **Reputation of the manufacturer**

OBJECTIVE 12

Complete Assignment Sheet 3.

OBJECTIVE 13

Optional Activities/ Resources
- Visit several local *livestock operations to* see different storage and handling practices.

Select true statements about proper feed storage and handling practices.

- **Storage problems**
  - **moisture** – The safe moisture level varies, depending on the type of feed being stored. If the moisture content is too high, the stored feed will rot. If the moisture content is too low, the chance of fire increases.
  - **insects** – Grains should be treated with a protectant at the time of harvest and grain storage bins should be cleaned thoroughly prior to use. Inspect storage bins regularly. Pesticides should be used at the first sign of infestation. Early treatment is effective.
  - **rodents** – The most significant problem with rodents is the contamination of the feed by urine and feces. A comprehensive sanitation program is the most effective method of reducing rodent problems. Storage facilities should be inspected regularly.

    ☑ **NOTE:** Contaminated feed is less palatable which reduces feed intake.

- **Requirements for a storage facility:**
  - well organized
  - dry
  - sanitary
  - minimum fire risk
  - suitable area for mixing feeds
  - rodent-proof
  - inspected regularly for signs of rodent and insect infestation

- **Factors that determine feed storage area requirements:**
  - size and type of livestock operation (cattle, sheep, swine, poultry)
  - the length of the pasture season
  - methods of feeding and management

- climate
- proportion of feeds produced on the farm (or ranch) compared to the proportion purchased

OBJECTIVE 14

Complete Assignment Sheet 4.

OBJECTIVE 15

Discuss energy values.

Required Activities/ Resources
- Transparency Master 4

You will see a transparency on the utilization of energy in a net-energy system.

WORDS YOU SHOULD KNOW	
calorie (c)	the amount of energy as heat required to raise the temperature of 1 gram of water 1° C
energy value	a measure of energy available from feed using energy
kilocalorie (kcal)	the amount of energy required to raise the temperature of 1 kilogram of water 1° C; equivalent to 1000 calories
megacalorie (Mcal)	the amount of energy required to raise the temperature of 1000 kilograms of water 1° C; equivalent to 1000 kilocalories or 1,000,000 calories
metabolism	the physical and chemical processes involved in the maintenance of a body
total digestible nutrients (TDN)	percentage of digestible matter, except minerals, in a feed; used as a measure of energy available from feed

Energy is a critical component of rations. Major sources of energy are carbohydrates, fats, and oils. Carbohydrates are the most common choice because they are readily available, easily digested, and cost effective. For many years, producers have measured the energy in rations using TDN.

- **Energy deficiency affects**
  - growth
  - the onset of puberty
  - the quantity of milk produced by lactating females
  - body weight
  - fertility and the estrus cycle
  - wool quantity and quality (sheep)
  - mortality rate
  - resistance to diseases and parasites
- **TDN - Total Digestible Nutrients**
  - TDN is a widely used measure for energy.
  - TDN is expressed in:
    - percentages

      EXAMPLE: The TDN for oats is 65% for swine.
    - pounds

      EXAMPLE: A calf weighing 331 lbs requires 6.8 lbs of TDN to gain 2.4 lbs per day.
  - TDN is the sum of the digestible: protein, fiber, nitrogen-free extract, and (fat x 2.25)

TDN =

digestible protein + digestible fiber + digestible nitrogen-free + (digestible fat x 2.25)

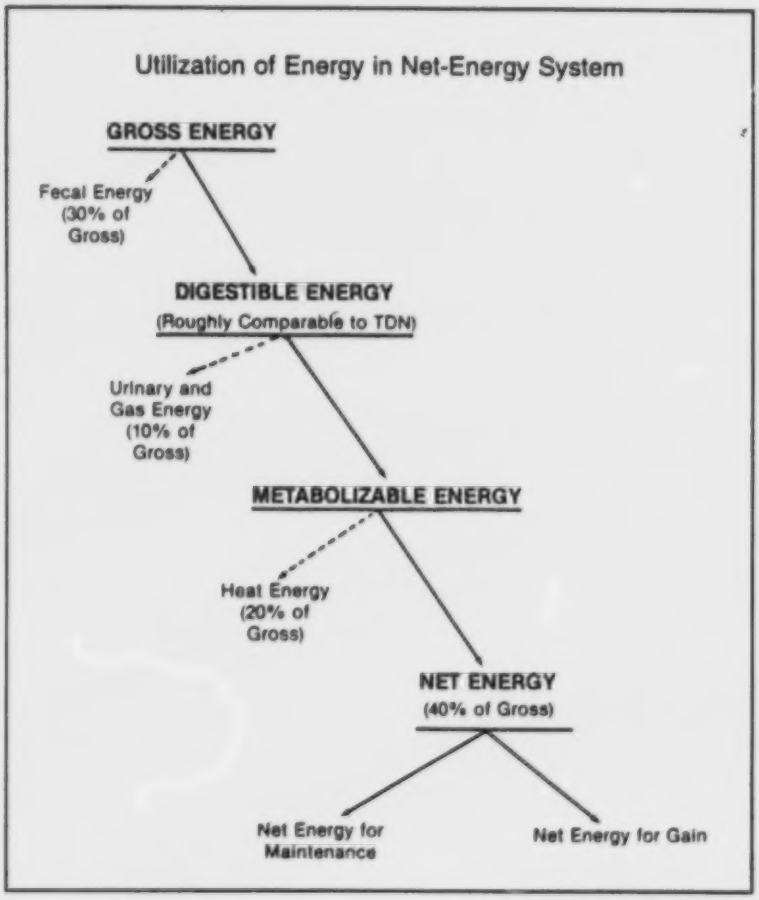
  - **Advantages of TDN**
    - TDN has been used for a long time and people are familiar with it.
    - Because it can be expressed in pounds, TDN is a useful unit when discussing feed.

- **Disadvantages of TDN**
  - TDN is not related to actual metabolism.
  - TDN does not take into consideration energy losses other than fecal losses (such as urine, gases, and heat).
  - TDN places too much value on roughage.

- **Energy values** (Figure 4)
  - Animal managers are changing to energy values (measured in calories) to determine feed rations because energy values are more accurate than TDN and take into consideration energy losses throughout the entire digestive process.
  - **gross energy (GE)** – the total combustible energy in a ration
  - **digestible energy (DE)** – the portion of the ration's gross energy that is not excreted in the feces
  - **metabolizable energy (ME)** – the portion of the ration's gross energy that is not lost in the feces, urine, or gas
  - **net energy (NE)** – the energy available for maintenance or gain; the energy left after fecal, urinary, gas, and heat losses are deducted from the gross energy

    ☞ **NOTE:** The subscript **m** is used for net energy maintenance (NE_m) and the subscript **g** is used for net energy gain (NE_g)
  - Energy values are expressed in calories (c), kilocalories (kcal), or megacalories (Mcal).

FIGURE 4



OBJECTIVE 16

Required Activities/ Resources
- Handout 1

Optional Activities/ Resources
- Talk to a livestock manager who utilizes net-energy about the practical applications of net-energy.

Choose the word or phrase to complete statements about net-energy.

- Net-energy gives precise measurements of the actual energy value of a ration.
- A net-energy ration system
  - determines maintenance levels required by an animal
  - predicts the amount of gain when the feed intake is known
  - determines feed intake required for a desired amount of gain

- Basic theories that govern the net-energy system:
  - A certain amount of energy is needed to maintain an animal at its present body weight.
  - Additional energy is needed if an animal is breeding, pregnant, producing milk, growing, or fattening.
- The National Research Council of the National Academy of Sciences has compiled net-energy data to be used by stock managers. (Table 1)

  ☛ **NOTE:** The tables provide comprehensive nutritional information under the titles, *Nutrient Requirements of Sheep, Nutrient Requirements of Beef Cattle, Nutrient Requirements of Poultry,* etc.

TABLE 1

Daily NE_m and NE_g Requirements for Beef Steers

Body weight (lb)	220	331	441	551	661	772	882	992	1100
NE_m required	2.43	3.30	4.10	4.84	5.55	6.24	6.89	7.52	8.14
Daily gain (lb)	NE_g required								
0.2	0.17	0.23	0.28	0.34	0.39	0.43	0.48	0.52	0.56
0.4	0.34	0.46	0.57	0.68	0.78	0.88	0.97	1.06	1.14
0.7	0.52	0.70	0.87	1.03	1.18	1.33	1.47	1.61	1.74
0.9	0.70	0.95	1.18	1.40	1.60	1.80	1.99	2.17	2.34
1.1	0.89	1.20	1.49	1.77	2.02	2.27	2.51	2.74	2.97
1.3	1.08	1.46	1.81	2.15	2.46	2.76	3.05	3.33	3.60
1.5	1.27	1.73	2.14	2.53	2.90	3.26	3.60	3.93	4.25
1.8	1.47	2.00	2.47	2.93	3.36	3.77	4.17	4.55	4.92
2.0	1.68	2.27	2.82	3.33	3.82	4.29	4.74	5.18	5.60

- The table conveys the following information:
  - As the body weight increases, the NE_m (energy required for maintenance) increases.

    EXAMPLE: If a steer weighs 220 lbs, the NE_m required is 2.43 Mcal. If a steer weighs 992 lbs the NE_m required is 7.52 Mcal.

- The NE_g (net energy available for gain) required for a small daily gain is less than the NE_g necessary for a large daily gain.

  EXAMPLE: A stock manager who has a 661 lb steer wants the steer to gain 0.2 lbs per day, has to provide 0.39 Mcal of NE_g. If the manager wants a gain of 1.8 lbs per day, the amount of NE_g would have to be increased to 3.36 Mcal.

- As an animal grows in size, the amount of energy necessary for the same rate of daily gain increases.

  EXAMPLE: An 1100 lb steer requires 0.56 Mcal of NE_g to gain 0.2 lb. A 331 lb steer requires 0.23 Mcal of NE_g to gain the same amount of weight (0.2 lb).

  ☑ **NOTE:** The full tables are more comprehensive. Handout 1 provides an example of the daily nutrient requirements for growing and finishing steer calves and yearlings.

OBJECTIVE 17

Required Activities/ Resources
- Review the Pearson square method of calculating rations.

Select true statements about balanced rations.

- The goal when developing balanced rations is to provide all the nutrients necessary for the animal in a cost-effective manner.

  ☑ **NOTE:** Ration costs usually represent one-half to three-fourths of the total cost in raising animals.

- Factors that influence the formula for balanced rations
  - availability and cost of different feed ingredients
  - weight and productivity of the animal
  - nutrition
  - composition of feeds under consideration
  - palatability and digestibility

- moisture content

  ☞ **NOTE:** When comparing feeds, the moisture content should be comparable. Moisture content can vary dramatically.

- soil analysis, to determine the quality of given feed ingredients

- The **Pearson square** method represents a relatively simple way of determining the proportions of two ingredients.

  - This method works best using only two ingredients. If three or more feeds are used, the protein content must be averaged.

  - This method balances only one nutrient at a time.

    ☞ **NOTE:** The step-by-step procedure will be outlined in Assignment Sheet 5.

    EXAMPLE: John wants to make 1 ton (2000 lbs) of ration with a 20% protein using feed A with 30% protein and Feed B with 10% protein. By using the Pearson square method, John calculates that 1000 lbs of feed A and 1000 lbs of feed B will give him the correct ration.

  - Determining feed compositions when considering more than two components is more difficult. Computer programs based on the trial-and-error method have been developed to assist in determining feed compositions to meet the different needs of livestock producers.

OBJECTIVE 18 **Complete Assignment Sheet 5.**

OBJECTIVE 19 **Complete Assignment Sheet 6.**

OBJECTIVE 20 **Complete Assignment Sheet 7.**

OBJECTIVE 21 **Complete Assignment Sheet 8.**

OBJECTIVE 22

Optional Activities/ Resources
- Visit a poultry operation to see feeding operations.

Choose the word or phrase to complete statements about poultry feed.

WORDS YOU SHOULD KNOW	
crumbles	pellets that have been processed by rolling
grit	small particles of granite
mash	feed ground to a medium-fine texture
pellets	mash that has been formed into pellets

- Facilities with small commercial flocks generally use a complete commercial feed. Large commercial operations will custom mix their feed.
- **Forms of poultry feed**
  - mash
  - pellets
  - crumbles

  ☑ **NOTE:** There is less waste when using pellets or crumble feeds.
- **Factors that affect feed intake:**
  - daily energy requirements
  - environmental temperature
  - health of the bird
  - genetics
  - nutritional balance of diet
  - stress
  - body size
  - rate of egg production or growth

- **feed composition** – The primary requirement that affects feed intake is energy. Poultry will continue to eat until their energy needs have been satisfied. Broilers, layers, and breeders all have different requirements and their feed compositions are different. The age of the bird (starter, grower, or developer) also affects nutritional needs.
  - **energy** – generally provided by corn
  - **protein** – includes 13 essential amino acids in the proper balance
  - **vitamins** – includes A, D, and E
  - **minerals** – includes calcium, phosphorus, sodium, and chloride
  - **xanthophylls** – compounds found in plants that produce the yellow color in the egg yolk and the yellow skin color
  - **antibiotics** – used to stimulate growth, improve feed efficiency, and increase egg production
- **water** – A bird needs approximately twice as much water by weight as the amount of feed.
- **grit** – Grit helps the bird grind food in its gizzard. (See objective 4). Grit comes in three sizes: small, medium, and large, depending on the age of the bird.

OBJECTIVE 23

Choose the word or phrase to complete statements about pasture requirements and grazing systems.

Optional Activities/ Resources
- Visit a local ranch to investigate the quality of the forage and the grazing method used at the ranch.

Grazing is an integral component of most beef cattle operations. Most cattle spend the majority of their lives grazing forages. The relationship between protein (including nitrogen) and fiber affect whether or not supplements are used.

- **Supplements are used to**
  - correct a deficiency in the forage diet caused by:
    - insufficient forage
    - overgrazed forage
    - weed infestation
    - seasonal shortfalls

- increase carrying capacity of forage supplies
- promote growth
- prevent or treat disease or other health problems
- train calves to eat supplements (making the transition to feedlots easier)

- Forage analysis is a critical component in determining what type of supplements to use. The quality of the forage directly affects the forage intake because it takes longer to digest high-fiber, low-quality forage. Supplements are needed to balance the diet (such as the relationship between protein and energy intake) and to correct dietary deficiencies.

- **Common deficiencies include:**

  - **protein** – A minimum level of protein is needed during development to insure proper growth. Forage protein levels are dependent upon

    - the maturity of the forage

      EXAMPLE: **GRASS HAY**

Stage at harvest	Amount of protein
immature (good)	17.8%
medium quality	9.5%
mature (poor)	7.5%

    - the amount of nitrogen in the soil (nitrogen-deficient soil produces forage with reduced protein levels)

      ☞ **NOTE:** Every amino acid contains nitrogen. Nitrogen must be absorbed from the soil through the root system.

    - the number of grazing animals

  - **energy** – Required energy levels for maintenance and gain may not be available from a given forage.

    ☞ **NOTE:** Protein and energy must be in balance to realize gains, especially if a protein supplement is used.

- **minerals** – Calcium and phosphorus levels decrease with maturity. Additionally, there are specific mineral deficiencies in the soils.

  ☞ **NOTE:** Local agriculture extension workers can provide information on area-specific mineral deficiencies. Do your research and be careful when you provide mineral supplements because the difference between required levels and toxic levels for some minerals is small.

- **Proper scheduling of protein and energy supplements**

  - You can give protein supplements every other day because studies indicate that cattle are capable of recycling nitrogen in their own bodies.
  - Give energy supplements on a daily basis so that the amount of the supplement can be kept to a minimum.
  - Rotate the timing of the supplements (especially when they are relatively large) so that the cattle don't stop grazing in anticipation of the supplements.

- **Management techniques to maintain the value of a pasture:**

  - Control grazing.
    - Protect first-year seedings.
    - Shift the location of salt and water.
    - Defer spring grazing.
    - Avoid late-fall grazing.
    - Avoid overgrazing or undergrazing.
  - Graze two or more kinds of animals.
  - Mow pastures and control weeds.
  - Control weeds with herbicides.
  - Fertilize pastures annually.
  - Distribute manure.
  - Irrigate pastures.

- **Grazing systems that can be adapted to individual needs:**
  - **continuous grazing** – uninterrupted grazing of a pasture by livestock throughout the grazing season
  - **rotation grazing** – two or more pastures are grazed and rested in a planned sequence
  - **intensive grazing** – a large number of livestock graze on a high-quality pasture to take advantage of the forage quality
  - **strip grazing** – animals are moved from one strip pasture to another on a daily basis
  - **creep grazing** – high-quality pasture is accessible only to young animals

OBJECTIVE 24 **Complete Assignment Sheet 9.**

OBJECTIVE 25 **Complete Assignment Sheet 10.**

OBJECTIVE 26 **Complete Assignment Sheet 11.**

ASSIGNMENT SHEET 1

NUTRITION, FEEDS, AND ADDITIVES

C-3

Name _____ Score _____

OBJECTIVE 6

Analyze nutritional deficiencies.

EQUIPMENT AND SUPPLIES

- Research materials on nutritional deficiencies

INSTRUCTIONS

Reading Comprehension
- Gain factual information

Research and Reference
- Select useful resources
- Locate resources

Functional Writing
- Complete forms and records

Life Science
- Investigate health issues

Your instructor will assign you two of the following nutritional diseases. Research the diseases and complete the forms on the following pages.

Your instructor will collect, copy, and distribute the reports so that each member of the class has a complete set of information on the nutritional deficiencies. This information will be used to complete Assignment Sheet 11.

NUTRITIONAL DISEASES:

acidosis
anemia, nutritional
bloat, feedlot
bloat, pasture
crooked calves
downer cow syndrome
enterotoxemia
fescue foot
founder
gossypol toxicity
grass tetany
hypoglycemia
iodine deficiency
ketosis
night blindness
osteomalacia
parakeratosis
photosensitization
liver abscesses
pulmonary emphysema
rickets
salt deficiency
cobalt deficiency
sweet clover disease
urinary calculi
weak calf syndrome
white muscle disease
milk fever

Nutritional deficiency: _____

Species affected:

_____

_____

Cause:

_____

_____

_____

Symptoms:

_____

_____

_____

Treatment:

_____

_____

_____

Prevention:

_____

_____

_____

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Nutritional deficiency: _____

Species affected:

_____

_____

Cause:

_____

_____

_____

Symptoms:

_____

_____

_____

Treatment:

_____

_____

_____

Prevention:

_____

_____

_____

ASSIGNMENT SHEET 2	NUTRITION, FEEDS, AND ADDITIVES	C-3

Name _____ Score _____

OBJECTIVE 10

Compare the composition, nutrients, supplements, and additives in different commercial feeds.

EQUIPMENT AND SUPPLIES

- Three commercial feed tags

INSTRUCTIONS

Reading Comprehension
- Gain factual information

Research and Reference
- Select useful resources
- Locate resources

Language
- Use standard grammar, spelling, and capitalization
- State ideas clearly

Composition
- Use complete sentences
- Compose essays

Functional Writing
- Complete forms and records

Life Science
- Investigate health issues

In this Assignment Sheet, you will analyze and compare three types of commercial feed. This Assignment Sheet is divided into three parts. In the first part, you will acquire three commercial feed tags. In the second part, you will record information about the feed on the information sheets. In the third part, you will write an essay comparing the feeds.

Part 1:

Your instructor will assign you one of the following: beef cattle, dairy cattle, poultry, or swine. You will then acquire three different commercial feed tags for that species.

Sources of feed tags include: feed retailers, feed manufacturers, livestock managers, and breeders. You instructor can recommend other sources.

Part 2:

Fill in the following information:

Tag 1:

Product name: _____

Brand name: (if applicable) _____

Net weight: _____

Cost: _____

Manufacturer: _____

Feeding directions:

_____

_____

_____

Amount of protein: _____

Amount of fat: _____

Amount of fiber: _____

Other ingredients (minerals and additives):

_____

_____

_____

_____

_____

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Tag 2:

Product name: _____

Brand name: (if applicable) _____

Net weight: _____

Cost: _____

Manufacturer: _____

Feeding directions:

_____

_____

_____

Amount of protein: _____

Amount of fat: _____

Amount of fiber: _____

Other ingredients (minerals and additives):

_____

_____

_____

_____

_____

Tag 3:

Product name: _____

Brand name: (if applicable) _____

Net weight: _____

Cost: _____

Manufacturer: _____

Feeding directions:

_____

_____

_____

Amount of protein: _____

Amount of fat: _____

Amount of fiber: _____

Other ingredients (minerals and additives):

_____

_____

_____

_____

_____

Part 3:

Compare and contrast the composition of the different feeds. Include the purpose for each type of feed and how the components will fulfill that purpose.

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ASSIGNMENT SHEET 3	*NUTRITION, FEEDS, AND ADDITIVES*	**C-3**

Name _____ Score _____

OBJECTIVE 12

Compare the cost of feeds with specific additives.

EQUIPMENT AND SUPPLIES

- Local feed supplier

INSTRUCTIONS

Reading Comprehension
- Gain factual information
- Draw conclusions

Language
- Use standard grammar, spelling, and capitalization
- State ideas clearly

Composition
- Use complete sentences
- Compose essays

Functional Writing
- Complete forms and records

Data Analysis and Display
- Construct charts and tables

Life Science
- Investigate health issues

This Assignment Sheet is divided into three parts. In the first part, your instructor will assign you two of the items from the list of feeds and additives below. You will then visit a local feed supplier to find out the information needed to complete a form for each product. In the second part, your instructor will copy and distribute the information so that you can create a table of the information. In the third part, you will write a short essay discussing factors that affect the price of feeds and additives.

Feeds and additives: (your instructor may add or delete items from this list, depending on availability)

Cattle feeds: (the protein percentages will vary)

38% protein cubes, natural
38% protein cubes with Bovatec

16% beef grower ration, medicated
12% beef grower ration, medicated
10% beef finisher ration, medicated

20% range and breeder cubes, natural
20% range and breeder cubes, urea

Hog feeds:

18% starter pellets, medicated
16% show pig pellets, medicated
16% pig grower pellets
14% hog finisher pellets
40% hog supplement meal

Cognitive Activities
- Identify critical elements/issues
- Draw conclusions
- Create a finished product

Roughages:	Silages:	Grains:
alfalfa hay	corn silage	barley
bermuda hay, excellent	sorghum silage	milo
bermuda hay, fair		corn, crimped
cottonseed hulls		corn, whole
oat hay		
wheat hay		

By-products:	Vitamins and Additives:	Minerals and Urea:
cane molasses	premix	trace mineral
alfalfa pellets	Bovatec	salt
cottonseed meal	Rumensin	4% mineral
peanut meal	Tylan	urea
rice bran	yitamin A	calcium carbonate
soymeal	vitamin E	sodium bicarbonate
sunflower meal		

Part 1: Provide the following information for each item assigned.

Name of feed or additive: _____

Product weight: _____

Cost: _____

Ingredients: (include, if applicable, information on protein, fat, and fiber)

_____

_____

_____

_____

_____

Name of feed or additive: _____

Product weight: _____

Cost: _____

Ingredients: (include, if applicable, information on protein, fat, and fiber)

_____

_____

_____

_____

_____

_____

_____

_____

_____

Part 2: Your instructor will copy and distribute the forms completed in Part 1. Using all of the forms, construct a four-column table showing the name, the net weight, the cost, and the ingredients.

Part 3: Write a short essay, one paragraph to one page, on the factors that affect the price of feeds and additives.

ASSIGNMENT SHEET 4	*NUTRITION, FEEDS, AND ADDITIVES*	**C-3**

Name _____ Score _____

OBJECTIVE 14

Design a feed storage area.

EQUIPMENT AND SUPPLIES

- Two or three storage facilities to visit, arranged by your instructor
- Note pad
- Computer and graphics program OR
- Graph paper
- Colored pencils
- Ruler

INSTRUCTIONS

Composition
- Construct graphics and symbols

Research
- Take notes

Math Application
- Use English and metric measures

- Collect/record information
- Create a finished product

Part 1:

Visit two or three feed storage facilities and take notes. Ask questions about the following:

- size of the operation (number of livestock)
- types of feed
- storage requirements
- types and sizes of storage containers
- sanitation practices
- rodent and insect controls
- fire and other safety equipment
- seasonal storage needs
- equipment needed to move and store feed
- problems (find out what doesn't work well)
- costs of storage

Part 2:

Use the information obtained in Part 1 to design a storage facility. Your final presentation should use a scale of ¼ inch = 1 foot, be neat, accurate, and should include the following. Use different colored pencils for different types of feed.

- number and type of livestock serviced
- location (for example: Minnesota or Oklahoma)
- storage capacity (remember excess storage capacity costs money; your storage capacity should be appropriate for the size of the livestock operation)
- types of feed stored
- rodent and insect controls
- equipment used to move feed
- fire and other safety equipment

ASSIGNMENT SHEET 5	*NUTRITION, FEEDS, AND ADDITIVES*	**C-3**

Name _____ Score _____

OBJECTIVE 18

Use the Pearson square to balance rations.

INSTRUCTIONS

Review the following example and calculate rations using the Pearson square method. Show your work.

Reading Comprehension
- Gain factual information

Functional Reading
- Interpret graphics and symbols

☞ **NOTE:** Protein and energy content nutrients can be found in *Feeds and Feeding.*

EXAMPLE: Sandy wants to make 1 ton (2000 lbs) of ration with 16% protein using corn with a 6.6% protein and soybean meal with 41% protein. How much of each will she have to mix together?

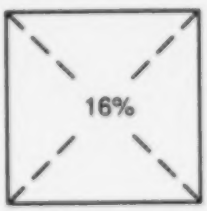
Operation and Calculation
- Calculate with whole numbers
- Calculate with decimals

Math Application
- Solve word problems
- Solve percent problems

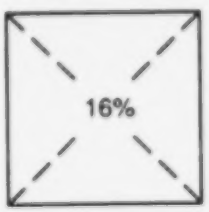
Data Analysis and Display
- Interpret charts and tables

1. Write the type of feed and percent of protein – corn, 6.6% and soybean meal, 41% – at the left-hand corners as shown. Write the 16% goal in the middle of the box.

Corn
6.6%



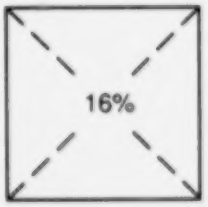
41%
Soybean meal



1:90

2. Subtract *diagonally* across the box. Subtract the smaller number from the larger number.

Corn
6.6 41 - 16 = 25 (25 parts corn)



41 16 - 6.6 = 9.4 (9.4 parts soybean meal)
Soybean meal

3. Add the parts of corn and the parts of soybean meal to get the total number of parts.

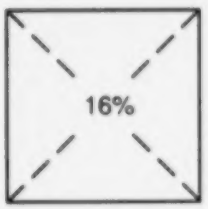
25 (corn) + 9.4 (soybean meal) = 34.4 total parts

4. Convert the parts of corn and the parts of soybean meal to percentages by dividing the number of parts of each feed by the total number of parts and multiply by 100%.

Corn: 25 ÷ 34.4 = .73 .73 x 100% = 73%

Soybean meal: 9.4 ÷ 34.4 = .27 .27 x 100% = 27%

	Parts	Percentage
Corn	25.0	73
Soybean	9.4	27
Total:	34.4	100



Using the percentages, calculate the amount of the ingredients needed to make 1 ton (2000 lbs) of ration.

73% corn x 2000 lbs = 1460 lbs corn

27% soybean meal x 2000 lbs = 540 lbs soybean meal

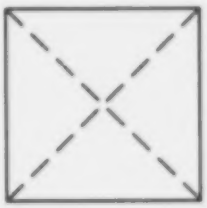
	Parts	Percentage	Pounds (lbs)
Corn	25.0	73	1460
Soybean	9.4	27	540
Total:	34.4	100	2000

Sandy would mix 1460 lbs of corn and 540 lbs of soybean meal to get 1 ton of ration with 16% protein.

1. Jim wants to make one ton (2000 lb) of ration with 14% protein using barley (11% protein) and a prepared supplement with a 36% protein mix. How much of each will Jim mix together?

	Parts	Percentage	Pounds(lbs)
_____	____	____	_____
_____	____	____	_____
Total:		100%	2000 lbs

2. Sarah wants to make one ton (2000 lb) of ration with 20% protein using corn (6.6% protein) and a protein supplement with a 44% protein mix. How much of each will Sarah mix together?

	Parts	Percentage	Pounds(lbs)
_____	____	____	_____
			
_____	____	____	_____
Total:		100%	2000 lbs

3. Jose wants to make one ton (2000 lb) of 16% ration using equal parts of corn (6.6% protein) and milo (8.8% protein), and equal parts of soybean meal (44% protein) and meat and bone scraps (55% protein). How much of each will Jose mix together?

   Hint: You will first have to average the protein values for the ingredient pairs.

(Average)	Parts	Percentage	Pounds (lbs)
_____	_____	_____	_____

(Average)			
_____	_____	_____	_____
Total:		100%	2000 lbs

(Average)	Parts	Percentage	Pounds (lbs)
Milo	_____	_____	_____
Corn	_____	_____	_____
Soybean meal	_____	_____	_____
Bone scraps	_____	_____	_____
Total:		100%	2000 lbs

ASSIGNMENT SHEET 6	*NUTRITION, FEEDS, AND ADDITIVES*	**C-3**

Name _____ Score _____

OBJECTIVE 19

Determine proper nutrient and water requirements for livestock in various stages of production.

EQUIPMENT AND SUPPLIES

- Handouts 2, 3, 4, 5, and 6

INSTRUCTIONS

Using the handouts on the guidelines for feeding sheep, swine, beef cattle, and dairy cattle, answer the following questions. Use complete sentences.

Reading Comprehension
- Gain factual information

Functional Reading
- Interpret graphics and symbols

Operation and Calculation
- Calculate with whole numbers

Math Application
- Solve word problems

1. During the breeding season, what should you feed your boars each day?

_____

_____

2. What should you feed ewes each day during the first fifteen weeks of gestation?

_____

_____

3. What should you feed rams on maintenance?

_____

_____

4. How many pounds of 14% CP should you feed a pig that weighs 140 lb?

_____

5. Jenny, a cow nursing a calf, is unable to graze during the winter. What should you feed Jenny?

_____

_____

6. In addition to 4.5 lb of alfalfa and grass mixed, what should you feed a ewe during the first eight weeks of lactation?

_____

_____

7. a. Young beef cattle should be fed approximately what percentage of their body weight?

_____

b. What should be the composition of the feed?

_____

_____

8. Why shouldn't you feed mature bulls the same rations as lactating cows?

_____

_____

_____

9. How many pounds of 13% crude protein should you feed a 210 lb pig ?

_____

10. A 700 lb beef steer requires approximately how much feed?

_____

11. What happens to the percent of crude protein required as pigs grow from 50 lb to market weight?

_____

_____

12. a. Which requires more feed for maintenance, a ewe or a ram?

_____

b. What is the difference?

_____

13. Why do cows in production that are on pasture require less crude protein than cows in production that are not on pasture?

_____

_____

_____

14. Do bred sows require more or less crude protein than nursing sows?

_____

15. a. Margaret, a producing cow on pasture, produces 60 lb of milk a day. How much 14% to 16% crude protein does she require per day?

_____

b. How much crude protein would Margaret require if you take her off pasture? (Assume that she continues to produce the same amount of milk.)

_____

16. If you have a herd of 60 mature sheep and 40 head of mature beef cattle, how much water will you need in field tanks every day?

_____

17. a. What is the minimum amount of water you should provide for your pigs per day if you have 22 bred sows, 16 lactating sows, and 42 pigs approaching slaughter? Show your work for each answer.

_____ gallons

b. What is the maximum amount you should provide?

_____ gallons

c. How many 40-gallon tanks will you need if you provide the maximum amount of water?

_____ tanks

ASSIGNMENT SHEET 7	*NUTRITION, FEEDS, AND ADDITIVES*	**C-3**

Name _____ Score _____

OBJECTIVE 20

Use a computer program to balance rations.

EQUIPMENT AND SUPPLIES

- Instruction sheet at the end of this Assignment Sheet
- OSU Current Report #3027 at the end of this Assignment Sheet
- AUTONRCA program (a spreadsheet program)
- AUTONRCA files titled: *Part1*, *Part2*, and *Part3*
- IBM compatible computer

INTRODUCTION

The purpose of this Assignment Sheet is to give you an opportunity to use a computer program to construct a complete diet for beef cattle. You will be able to create different feed compositions and check whether or not they are balanced.

The benefit of the program is that the computer completes the necessary calculations. The most effective way to use this program is to experiment with it – play with it. The program is based on a Lotus spreadsheet; accordingly, you will have to learn some basic keystrokes to use the program. Read the instruction sheet and OSU CR-3027 thoroughly before you begin. If you have any questions, ask your instructor.

INSTRUCTIONS

Reading Comprehension
- Gain factual information

Research and Reference
- Use computer data base

Functional Reading
- Follow written instructions

This Assignment Sheet has three parts. Part 1 provides you with an opportunity to view a AUTONRCA file and answer some questions. In Part 2, you will input feed components into the program. In Part 3, you will formulate a complete diet.

☑ **NOTE:** This is an exercise only. Meeting the requirements calculated by this program does not guarantee that the ration is safe to feed.

- Use computer spreadsheets

1303

Life Science
• investigate health issues

PART 1:

Retrieve the file titled *Part1* and answer the following questions.

☑ **NOTE:** You will not have to input any information. You are simply retrieving information from the spreadsheet.

1. List the twelve ingredients in the feed.

   _____

   _____

   _____

   _____

   _____

2. Provide the following information about the animal.

   weight: _____

   body type: _____

   amount of feed fed per day: _____

3. Is the diet complete? _____

4. What dietary nutrients are in excess?

   _____

5. What is the daily cost as fed? _____

6. What is the expected daily rate of gain? _____

7. What is the TDN as fed? (percentage) _____

8. What are the grains listed in the ingredients library?

   _____

   _____

9. What is the percentage of calcium in excellent quality alfalfa hay? _____

10. How many pounds of soymeal 44 would you add to a 1000 lb batch? _____

Part 2:

Retrieve the file titled *Part2* and input the following data.

☞ **NOTE:** You will have to get the ingredient number from the ingredient table.

Ingredient	**Amount**
ALFALFA HAY GOOD	10.0
CORN DENT NO2	35.0
MILO, ROLL, GRND	18.0
OAT HAY	7.0
PEANUT MEAL	3.0
PREMIX	.2
RUMENSIN 60	.02
LIMESTONE 38%	.6
UREA	.3

Animal description: large-frame heifer calf, 800 lb

Feed per day: Estimate based on 2.5% of bodyweight

800 lb x .025 = 20.0 lb

Answer the following questions.

1. Is the diet deficient in any component? _____
2. What is the cost of the feed per day? _____
3. What is the calculated gain per day? _____
4. What happens to the price per day if you increase the amount of Rumensin 60 to 0.1? Why?

_____

_____

_____

_____

Stop and have your instructor check your answers to Part 2 before you continue on to Part 3.

Part 3:

Use the file titled *Part3* for this section.

Using ingredients that are readily available in your area, compute a balanced diet for a 700 lb medium-frame heifer calf where the heifer gains at least 3 lbs per day.

Find the best possible price by trying a variety of different formulas.

Save your final spreadsheet and print a copy to hand in to your instructor.

Instruction Sheet for Using compiled OSU Animal Science Spreadsheets

Donald R. Gill and Keith S. Lusby
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Animal Science Department, Oklahoma State University

INTRODUCTION

Recent software developments now make it possible to convert spreadsheet files such as those written on LOTUS 1-2-3 to machine language. The spreadsheets can then be run from DOS without the original spreadsheet program. The compiling software cannot be copied, but the compiled spreadsheet along with the execution program can be legally copied. We have compiled several of the Animal Science files using a program called BALER (Baler Software Corporation).

Advantages

1. The compiled spreadsheets run much faster.
2. You do not need to own the spreadsheet software.
3. The compiled files run with the same commands as the original LOTUS 1-2-3 spreadsheet files.

Disadvantages

1. You cannot see any formulas used in the spreadsheet file.
2. You cannot alter any formulas in the spreadsheet file. For those who simply want to use a spreadsheet file, this is no problem. For those who want to tailor spreadsheets or write spreadsheet files, it is still necessary to purchase a spreadsheet program.
3. You will still have to know how to use LOTUS 1-2-3 because the same commands are used.

DIRECTIONS

Using the compiled spreadsheets

For users with two 5-inch, 360K disk drives – Load the files named RUN.EXE, BALER.BAT and CUSTOMIZ.HLP onto your A drive. Load all other files onto the B drive. The execution program is on the A drive and spreadsheet files are kept on the B drive, the same as you would have done with LOTUS.

For users with 3.5 inch drives (744K or greater) – All files will fit onto a single drive.

For users with hard drives – Create a directory named BALER and load all files onto that directory.

After all files have been copied or loaded, the spreadsheets can be accessed by typing BALER or RUN followed by the name of the program you wish to run. If you are using two 5-inch drives, you must be using the A drive. If you type BALER, the spreadsheet titled APAST will come up. This permits you to access all other spreadsheet files. As with LOTUS, type the sequence /FR (file, retrieve) to view available files. You may need to reset the default directory (the disk or directory on which you want your working files kept). To do this type /FD and enter the disk or directory on which the files are to be kept.

While you cannot alter any formula in a compiled spreadsheet, you can save different spreadsheet files containing data that you may want to keep. For example, you might generate three new pasture budgets with different prices. To save one of the new files, the command sequence is /FS (file, save), just as in LOTUS. Enter a new name for your new file and hit enter to save the file. There is however, one difference when you want to call up the new file. Baler stores only the data in the new spreadsheet, rather than the entire spreadsheet. The new spreadsheet is accessed by typing /FG (file, get) after the original spreadsheet has been loaded. For example, if you saved new data on the spreadsheet named PASTURE and named it PATURE2, you would load PASTURE and then type/FG. A menu of available files is shown at the top of the screen. You would move the cursor to PASTURE2 and load the file by hitting the enter key.

The only other difference between LOTUS and the compiled files is that when changing a date, the F9 (function 9) key must be used to effect the date change. All other calculations are in automatic mode. The compiled spreadsheets are very fast and manual recalculation is not normally needed.

Spreadsheet Programs For Calculation of Complete Diets For Beef Cattle, Checking For Nutrient Balance and Estimating Gain (AUTONRCA & AUTONRCD)

D. R. Gill, K. S. Lusby and F. N. Owens
Animal Science Department

For years nutritionists balanced rations using the trial and error technique. With the advent of the microcomputer and spreadsheets, this time consuming chore can be easily and quickly accomplished. The spreadsheets described herein can be obtained from OSU. They were written for Lotus 123 but are also available in compiled form for use without spreadsheet software.

These programs combine the OSU program for "Calculating Livestock Rations" (RATION) and the nutrient requirements for energy, protein, calcium and phosphorus for beef cattle in drylot derived from the Nutrient Requirements of Beef Cattle (NRC) published by the National Academy of Sciences in 1984.

AUTONRCA is written for the user who wishes to formulate or evaluate on an "as is" moisture basis, while **AUTONRCD** is the program for those applications where formulation should be on a dry matter basis. The examples discussed in this report are all from the AUTONRCA version of the program. The user should have no problem with the dry matter version.

For the non-skilled nutritionist, these programs may be used to check a feed mixture to see if it meets the NRC recommendations for a given weight and class of growing-finishing cattle. Either of these programs allows the user to maintain a library of up to 79 feeds while being able to use up to 16 feeds in a formulation matrix for formulation.

Four different Macro programs have been incorporated to aid the user in three different functions. The first Macro is activated by simultaneously pressing the **Alt** and **S** keys and accesses the feeds library for **SELECTION** of feeds to use in the program. A few feed ingredients such as might be found in the library are shown in Table 1. The nutrient composition of these feeds including trace mineral content would be shown on the computer screen. The user scans the list of feeds in the library, selects those he wishes to use and jots down their feed number found at the left of the ingredient names. Any changes in nutrient composition and/or prices must be made in the library. When nutrient composition and prices are correct, the user presses the **"HOME"** key on the computer. This places the cursor back to cell A1, the upper left-hand corner of the formulation matrix. The feed numbers of desired feeds are entered beginning in cell A2 and continuing down column A. A **Zero** placed in column A, rows 2-17, will blank out the feed name and data on rows not used, permitting the user to only see feeds used in a given formulation. Simultaneously pressing Alt and Z will clear unneeded zeros from the screen.

The next important Macro function after the feeds are selected is the **FORMULATE** command. To activate, simultaneously press the Alt and F keys. This command will place the cursor in cell C1 of the formulation matrix and will place a title lock on the feed names so that as the user scrolls to the right to check nutrient composition of the feeds selected, the feed name will be locked in the left column. If during formulation, the user decides to change a nutrient value or price for an ingredient, the changes must be made in the feed library. To edit the library, use the **EDIT** function (**Alt E**). This command will move the cursor to the library where changes may be made.

If you need to add a feed to the library, first use the **SELECT** command and type the new feed name next to an unused number. Then use the **EDIT** command to enter the nutrient coefficients. When completed, use the **FORMULATE** command which will place the cursor in column C2 of the formulation matrix, where amounts of each feed selected for your ration are entered in the appropriate row in column C.

Formulating Wtih AUTONRCA - "AS FED" Version

The program has two functions. The first is to calculate the nutritional composition of a feed mixture on an "as fed" basis. The second is to generate the nutritional requirements of growing and finishing cattle. Using the two functions together, it is possible to develop a ration which is correctly balanced for a specific weight and type of animal. The formulation matrix will hold up to 16 feeds and their nutrient composition. Nutrients, other than dry matter and cost must be entered on a dry matter basis. The "as fed" composition of the ration is entered by the user in the "C" column. If the user desires to use the dry matter version (**AUTONRCD**), the ration composition will be entered on a dry matter basis. This is the only difference between the two programs. It is not necessary for the total amount of feed entered in the C column to add to 100. This program can calculate the nutrient composition on any amount of feed (for example 13.5 lbs, 100 lbs, or 2500 lbs). Remember that cost is entered on an "as fed" basis.

There are a large number of calculations hidden to the right of the screen. This portion of the program contains nutrient totals. In the example ration supplied with the program (**AUTONRCA**), the user can see that of the 10.19 percent protein in the ration, 6.27 units came from corn and 0.88 units came from soybean meal. These cells should

BEST COPY AVAILABLE

TABLE 1. Example Feed Listing For The Ingredient Library

FEED NAME	D.M.%	NEM	NEG	PROT	K%	CA%	PHOS	COST	MG	S	ZO	CU	FE	MN	SE	ZN	TDN%
1 ROUGHAGES																	
2 ALFALFA HAY ERC	88.00	66.01	37.72	20.00	2.71	1.06	0.30	4.25	0.35	0.41	0.17	9	119	41	0.28	24	60.00
3 ALFALFA HAY GOOD	88.00	59.54	33.63	19.00	1.90	1.89	0.29	4.25	0.35	0.38	0.16	10	112	41	0.28	27	60.00
4 ALFALFA HAY FAIR	88.00	56.00	30.01	16.30	2.09	1.50	0.27	4.25	0.33	0.29	0.15	11	127	42	0.28	20	56.00
5 ALFALFA HAY POOR	88.00	47.50	22.27	14.00	2.15	1.02	0.26	4.25	0.32	0.20	0.10	10	136	44	0.29	21	52.00
6 BERMUDA HAY	88.00	37.72	13.16	9.90	1.53	0.47	0.17	4.00	0.21	0.23	0.12	7	108	140	0.12	20	48.00
7 BERMUDA HAY GOOD	88.00	42.27	17.72	6.60	1.55	0.51	0.24	4.00	0.22	0.21	0.12	6	125	145	0.05	17	49.00
8 COTTONSEED HULLS	90.00	47.00	10.08	4.60	0.90	0.15	0.09	3.00	0.14	0.09	0.02	13	131	119	0.30	22	47.00
9 COTTON BURRS	92.00	34.09	10.00	11.00	2.73	0.99	0.12	2.00									44.00
10 PRAIRIE HAY	90.00	45.45	20.45	5.80	1.08	0.43	0.15	3.00	0.29	0.07	0.13	7	120	110	0.06	34	69.00
11 SUDAN HAY GOOD	91.00	54.00	28.00	8.10	1.87	0.40	0.26	4.00	0.51	0.06	0.13	37	160	91	0.13	38	58.00
12 SUDAN HAY FAIR	91.00	52.00	24.00	4.80	1.87	0.45	0.20	3.00	0.51	0.06	0.13	37	160	91	0.13	38	52.00
13 OW BLUESTEM GOOD	90.00	59.00	34.00	10.00	1.95	0.38	0.20	3.00	0.18	0.18	0.10	9	120	60	0.13	24	68.00
14 OW BLUESTEM FAIR	90.00	52.00	25.00	5.80	1.95	0.38	0.20	3.00	0.18	0.18	0.10	9	120	60	0.12	24	51.00
15 OAT HAY	90.00	60.00	32.00	8.90	0.94	0.24	0.22	3.00	0.26	0.26	0.07	10	106	94	0.17	30	66.00
16 WHEAT HAY GOOD	87.00	70.00	40.00	11.50	1.05	0.15	0.20	4.00	0.40	0.22	0.10	23	74	40	0.19	33	68.00
17 WHEAT HAY FAIR	88.00	55.00	31.00	8.50	1.69	0.15	0.29	3.00	0.12	0.22	0.10	22	74	49	0.09	33	49.00
18 WHEAT STRAW	89.00	29.00	5.00	3.80	1.42	0.19	0.05	2.00	0.12	0.19	0.05	4	167	41	0.09	29	41.00

never be altered because they contain necessary intermediate steps for computing the ration. Any cell that should not be changed is protected to prevent inadvertent removal of an equation.

The formulation matrix can contain a maximum of 16 feeds so that the nutrient names can be seen at the top of the screen and the computed composition and requirement values can be seen at the bottom of the screen at the same time. Moving the cursor to the top left hand cell on the screen (use the "HOME" key) will provide the best positioning of the formulation matrix for viewing.

In order to generate accurate requirement data, the user must enter the proper information about cattle, sex, weight and type. From the **HOME** position (cell A1), this information can easily be entered by pressing the **Page Down** key. The animal weight is entered in cell D24, the body and sex type in cell D25 and the daily amount of "as fed" feed the animal is expected to eat is entered in cell D23.

Six combinations of sex and animal type are available and are listed below. When a number from 1-6 is entered, the description of that type is listed on the screen.

1. LARGE-FRAME BULL CALVES AND COMPENSATING LARGE-FRAME YEARLING STEERS.
2. LARGE-FRAME HEIFER CALVES AND COMPENSATING MEDIUM-FRAME YEARLING HEIFERS.
3. LARGE-FRAME STEER CALVES AND COMPENSATING MEDIUM-FRAME YEARLING STEERS.
4. MEDIUM-FRAME BULLS.
5. MEDIUM-FRAME HEIFER CALVES.
6. MEDIUM-FRAME STEER CALVES.

A realistic estimate of feed intake is required for this program to be useful. Dry matter intakes usually range from 2-3 percent of body weight for growing-finishing cattle. Note that the "as fed" intake is converted to dry matter in cell I23. If your values are out of this range, the ration will likely not be correct. With experimentation, the user will discover that the "correct nutrient composition" of a diet will likely change with changes of any of the following: feed intake, animal weight, and body type. These changes will be quite large with light weight cattle. A sample of selection for animal weight, sex and type follows:

AS IS FEED PER DAY	19
ANIMAL WEIGHT LBS.	650
BODY TYPE	6

The animal requirements for energy (NEm and NEg), protein, calcium and phosphorus were calculated from the 1984 NRC requirements of beef cattle and these equations are placed in a lookup table at cells N31...R36. The units in this table are for gain "GAIN, pounds per day" protein "PROT, pounds per day" calcium "CA, grams per day" and phosphorus "PHOS, grams per day". The expected gain (shown twice in cells D20 and I23) is calculated by using the NEm and NEg values calculated in cells E19 and F19 for the body weight (cell D24) the expected feed intake (cell D23) and the body type (cell D25).

The user must use caution and only evaluate rations which will lead to gains of over 0.5 and less than 3.5 pounds per day to stay within the valid weight ranges for which the prediction equations were developed. Animal weight should be between 300 and 1000 pounds for medium frame animals and between 300 and 1100 pounds for large frame animals. In row 20 of formulation matrix, the computed values for protein, calcium and phosphorus are shown to aid in the development of the ration.

The calculated nutrient composition of the diet is found just below the animal sex, weight and type. To the right of these are the NRC recommendations for the animal described. The status of each nutrient is shown in the fourth column.

In this program the NRC requirements for energy, protein, calcium and phosphorus are calculated by formula. The user need only get protein percentage within 0.05 percentage units of the requirement to avoid the "deficient" status label. Calcium percentage has a tolerance of 0.02 and phosphorus 0.01 to avoid the deficient status label. It is occasionally possible for the protein requirement (determined by the animal's weight and rate of growth) to drop below the protein requirement of the rumen microorganisms. This most often occurs with finishing cattle weighing over 800 pounds. In order to avoid this problem, this program contains an "IF" statement that will not allow the percent of protein in the diet to drop below 10.5 percent crude protein on a dry matter basis.

Mineral requirements are "looked up" in a table (Table 3) reproduced from the 1984 NRC bulletin (cells N39...V52). The NRC suggests an acceptable range for minerals. Mineral levels below this range are labeled (**DEFICIENT**), within the range (**ADEQUATE**) and above the range are labeled (**EXCESSIVE**). Because most of the minerals when used in excess are toxic, this range is identified (**TOXIC**). There is also a **SUGGESTED** value shown in Table 3.

Understanding Nutrient Recommendations

A deficiency of any mineral can lead to reduced performance, and in cases of prolonged deficiency, to any number of disorders. Deficiencies should be remedied by

TABLE 2. Sample Screens and Output From AUTONRCA

FEED NAME	AMOUNT	D.M.%	NEM	NEG	PROT	K%	CA%	PHOS	COST
ALFALFA GOOD	5.00	90.00	57.0	27.0	16.0	1.50	1.25	0.22	4.00
COTTONSEED HULLS	4.00	90.00	47.0	10.0	4.0	0.90	0.15	0.09	3.00
CORN DENT NO 2	77.41	88.00	103.0	67.0	9.2	0.40	0.02	0.29	5.00
CANE MOLASSES	5.00	75.00	77.3	49.1	5.8	3.84	1.00	0.11	3.90
SOYMEAL 44	2.00	90.00	87.0	59.0	48.9	2.52	0.16	0.81	8.50
WHEAT MIDDS	5.00	89.00	78.4	45.5	18.4	1.37	0.13	1.18	5.00
LIMESTONE 38%	0.83	99.80				0.09	39.40	0.09	2.25
SALT	0.30	97.00						2.25	
RUMENSIN 80	0.03	90.00						402	
TYLAN 40	0.01	90.00						428	
VITAMIN A-30,000	0.02	90.00						140	
UREA	0.40	99.00			288.0			9.00	
TOTAL & AI COMP	100.00	87.79	82.28	52.14	10.19	0.62	0.45	0.28	5.05
TARGET FOR GAIN OF:		3.41		LBS/DAY--->	10.12	0.57	0.44	0.22	

AS IS FEED FED PER DAY	19	DRY MATTER FEED/DAY	16.68
ANIMAL WEIGHT LBS.	550	CALCULATED GAIN / DAY	3.41
BODY TYPE	6	AS FED FEED / # GAIN	5.58

MEDIUM-FRAME STEER CALVES.

NUTRIENT	COMPOSITION AS FED	NRC RECOMMENDATION D.M	DM %	STATUS
NEm Mcal/CWT.	82.28	93.73	******	
NEg Mcal/CWT.	52.14	59.39	******	
TDN %	75.58	86.10	******	
Fat %	3.31	3.77	******	
Crude Fiber	4.91	5.59	******	
Crude Protein %	10.19	11.61	11.53	ADEQUATE
Potassium %	0.62	0.71	0.65	ADEQUATE
Calcium %	0.45	0.51	0.50	ADEQUATE
Phosphorus %	0.28	0.32	0.28	ADEQUATE
Magnesium %	0.15	0.17	0.1	ADEQUATE
Sulfur %	0.15	0.17	0.1	EXCESSIVE
Cobalt ppm	0.19	0.22	0.1	EXCESSIVE
Copper ppm	7.8	8.8	8	ADEQUATE
Iron ppm	55.3	63.0	50	ADEQUATE
Manganese ppm	22.2	25.3	40	ADEQUATE
Selenium ppm	0.15	0.18	0.2	ADEQUATE
Zinc ppm	19.8	22.5	30	ADEQUATE
Cost / cwt.	$5.05	$5.75		

CALCULATED MOISTURE OF "AS IS" MIXTURE IS >>> 12.21 PERCENT

DEVELOPED AT OKLAHOMA STATE UNIVERSITY; BY D. R. GILL & F. N. OWENS
FILE NAME IS --->>> AUTONRCA (MSDOSLOTUS123)
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TABLE 3. NRC Mineral Requirements and Maximum Tolerable Levels for Beef Cattle

Mineral	Requirement: Suggested Value	Requirement: Range	Maximum Tolerable Level
Cobalt, ppm	0.10	0.07 to 0.11	5
Copper, ppm	8	4 to 10	115
Iodine, ppm	0.5	0.20 to 2.0	50
Iron, ppm	50	50 to 100	1000
Magnesium, %	0.10	0.05 to 0.25	0.40
Manganese, ppm	40	20 to 50	1000
Potassium, %	0.65	0.5 to 0.7	3
Selenium, ppm	0.20	0.05 to 0.30	2
Sulfur, %	0.10	0.08 to 0.15	0.40
Zinc, ppm	30	20 to 40	500

adding appropriate minerals or substituting different feed ingredients.

Users inexperienced in nutrition may be surprised at how frequently formulations involving common feeds and forages will elicit an **EXCESSIVE** label. For example, if the diet contains a large percentage of alfalfa hay, the amounts of potassium and calcium will be above the recommended levels and labeled **EXCESSIVE**. This is usually not serious if the minerals like calcium and potassium largely come from natural feeds such as soybean meal or alfalfa hay. If, on the other hand, the excess of calcium comes from an oversupply of limestone or the potassium comes from potassium chloride, then there could be serious nutritional problems. In many cases it will not be possible or wise to formulate rations without one or more nutrients labeled **EXCESSIVE**. Beware, however, of rations in which any nutrient is detected near the **TOXIC** range. When in doubt about the safety of any ration, inexperienced users should consult a qualified animal nutritionist.

BEST COPY AVAILABLE

The feeds shown in this example were chosen because they are familiar to most Oklahoma producers. The coefficients may not be correct for your feeds and analysis of your feeds is suggested. Any of these feeds that are not used can be replaced with a feed useful to you. The data for the trace minerals given in this table were taken from the 1984 NRC publication except in cases where better data were available in Oklahoma.

User Hints

In order to speed operations, especially if you have a slow computer, you may want to set the program to "manual recalculation". The keystroke sequence is **/WGRM**. This permits the user to make any number of changes in feeds and nutrients before the program calculates the ration. When the user is ready to calculate the ration, the **"F9"** function key is pressed. The program will flash **"wait"** in the upper right hand corner of the screen while it is calculating. Users with faster computers may want to use the "automatic" default and let the computer recalculate after each keyboard entry. To reset to automatic recalculation, the keystroke sequence is **/WGRA**. The spreadsheet is more readable if the user uses the zero suppression option (**ALT Z**).

Calculating a Ration Using AUTONRCA ("AS FED" Version)

Rations are calculated by trial and error. Although this may seem crude, the speed of the computer makes this relatively efficient.

First, press **Alt F** keys to move the cursor to the top left hand corner of the screen. Next, check the nutrients in the selected feeds. If they need to be changed to correctly represent the feeds you are using, press **Alt E** to **EDIT**. New feeds can be added by using the **SELECT** (**ALT S**) option. Be sure to enter new nutrient data for the new feed. Note that cost of each ingredient is entered in terms of **$/hundred weight on an "as fed", or wet basis,** the way most feeds would be quoted from a feed store.

Next, enter your initial "guesses" for percentages of each ingredient to be used in the ration. The total does not need to add to 100 for calculation of the ration, but keeping the total at 100 may make it easier to visualize the proportions of each feed as you make your first entries. Nutrient values in this program (**AUTONRCA**) other than amount, dry matter and cost must be on a "DRY MATTER" basis. The percentage of protein, calcium, and phosphorus required for the indicated animal and feed intake are shown in the bottom line of the formulation matrix on an "as fed" basis.

Once the ration composition is complete, the user can scroll down and recheck the animal data. The most important calculated output is the "FEED DRY MATTER PER DAY" because this number is used with the energy values of your ration to calculate daily gain. This is calculated from your input "as fed" feed per day. The animal's sex, weight, type and gain are used to determine its nutritional requirements. Because gain is calculated using only the energy values, the calculated gain might not occur if the ration is not adequate in protein, potassium, calcium, phosphorus, and other minerals.

There are additional nutrient requirements other than those described in this program, among these are salt, vitamins A and E. Cattle also have requirements for "roughage factor" and are very sensitive to the rates at which various nutrients in the diet become available within the digestive tract. **If the user has no training in nutrition, use of this program should** be limited to checking proven formulas **to verify that they are adequate for the class of cattle being fed. Simply meeting requirements calculated by this program does not guarantee that the ration is safe to feed.**

Feed intake and the energy content of the diet determine the rate of gain and thus the other calculated requirements. The cost of gain contributed by feed can easily be calculated. This calculation is useful to experienced nutritionists, but without extensive knowledge of ration formulation and cattle management, could cause some users to overestimate feed intake or develop diets which could lead to founder or acidosis.

Once the ration composition is complete, the user can scroll down to the **Feeding Sheet** (Table 4) to view the final ration. Ingredients are listed as percentages on "as fed" basis, "dry matter" basis, and as pounds for two batch sizes. The user can change batch sizes from the keyboard for the two batch columns to produce desired batch sizes for mixing. If the program is running in the manual mode, the user must press F9 each time a change is made in order to recalculate the new batches.

When To Use AUTONRCA or AUTONRCD

If all potential ingredients contain about the same percentage of moisture (i.e. grains, dry hays, protein meals etc.) the "as is" version AUTONRCA is usually the easiest to use. However, if rations will contain feeds with varying contents of moisture (i.e. silages and grains) AUTONRCD is the program of choice with formulations done on a dry matter basis.

TABLE 4. Sample Feeding Sheet From AUTONRCA

RATION DEVELOPED FOR—>> Your Name
DATE Address
01/06/91 Town

FEEDING SHEET FOR —>> LB. BATCH—>>>1000 2000

FEED NAME	% D.M.	% AS FED	POUNDS	POUNDS
ALFALFA GOOD	5.1260	5.00	50.00	100.0
COTTONSEED HULLS	4.1008	4.00	40.00	80.00
CORN DENT NO 2	77.5969	77.41	774.1	1548.
CANE MOLASSES	4.2717	5.00	50.00	100.0
SOYMEAL 44	2.0504	2.00	20.00	40.00
WHEAT MIDDS	5.0690	5.00	50.00	100.0
LIMESTONE 38%	0.9417	0.83	8.300	16.60
SALT	0.3315	0.30	3.000	6.000
RUMENSIN 60	0.0256	0.03	0.250	0.500
TYLAN 40	0.0128	0.01	0.125	0.250
VITAMIN A-30,000	0.0226	0.02	0.220	0.440
UREA	0.4511	0.40	4.000	8.000
TOTALS	100.00	100	1000	2000

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ASSIGNMENT SHEET 8	*NUTRITION, FEEDS, AND ADDITIVES*	**C-3**

Name _____ Score _____

OBJECTIVE 21

Calculate balanced rations for livestock on a hypothetical farm.

EQUIPMENT AND SUPPLIES

- Handouts 2, 3, 4, and 5
- AUTONRCA spreadsheet for calculating rations
- Other resources (suggested below)

INSTRUCTIONS

Reading Comprehension
- Gain factual information

Research and Reference
- Use computer data base

Functional Reading
- Interpret graphics and symbols

This Assignment Sheet will provide you with an opportunity to use information from the previous objectives and Assignment Sheets to calculate balanced rations for livestock on a hypothetical farm of your choice. Choose a livestock composition that interests you.

Excellent sources of information include managers of livestock facilities and managers of local feed stores. These sources are especially useful when you are considering cost. One goal is to produce a hypothetical operation that is cost effective.

Before you begin your ration calculations, have your instructor check your hypothetical farm ideas.

- Solve practical problems
- Use computer for computation
- Use computer spreadsheets

Items to consider:

- number and type of livestock
- size of your facility
- number of workers needed
- feed types (energy and protein requirements)
- minerals and additives needed

Life Science
- Investigate health issues

Prepare a chart that outlines the daily needs of your operation. Estimate, to the best of your ability, your feed costs.

Cognitive Activities

- Collect/record information
- Create a finished product
- Transfer knowledge/training to new situations
- Apply new technology
- Develop an action plan

ASSIGNMENT SHEET 9	NUTRITION, FEEDS, AND ADDITIVES	C-3

Name _____ Score _____

OBJECTIVE 24

Identify pasture requirements.

EQUIPMENT AND SUPPLIES

- OSU Extension Facts No. 2568

INSTRUCTIONS

This Assignment Sheet uses OSU Extension Facts No. 2568 to develop concepts discussed in the Information Sheet. Consult the Fact Sheet and the table of *Oklahoma Feeds and Forages* at the end of the Assignment Sheet to answer the following questions.

Reading Comprehension
- Gain factual information

Functional Reading
- Interpret graphics and symbols

Data Analysis and Display
- Interpret charts and tables

Life Science
- Investigate health issues

1. What happens to the quality of forage as it grows older?

_____

_____

_____

2. How does digestibility affect forage intake?

_____

_____

_____

3. Refer to the table of *Oklahoma Feeds and Forages*.

   a. If you are looking for land to raise forage and livestock on, which county has the highest percentage of phosphorus and potassium in the soil?

   _____

   b. Compared to other counties, which minerals are likely to be deficient in the soil of the county you selected, so that you would consider adding those minerals to the feed?

   _____

4. How does nitrogen fertilizer increase the protein content of forage?

5. Why is crude protein so important when considering the value of pastures and forages?

6. What happens to the level of crude protein as the the level of nitrogen fertilization increases?

7. How often should fertilizer be applied to warm season species such as bermuda and lovegrass?

8. How often should you make decisions regarding fertilization?

9. What is an alternative to using nitrogen fertilizer to increase forage content?

Oklahoma Feeds and Forages (Dry Matter Basis)

	Ca %	P %	Mg %	K %	Na %	S %	Cl %	Fe ppm	Zn ppm	Cu ppm	Mn ppm	Mo ppm	Se ppm
Alfalfa Hay, Washita County	1.56	.30	.28	2.71	.036	.41	.46	119	24	9	28	2.7	.18
Alfalfa Hay, Pontotoc County	1.89	.21	.41	1.52	.034	.36	.46	112	18	10	41	1.6	.38
Alfalfa Hay, Pontotoc County	1.35	.30	.34	2.15	.064	.28	.59	127	27	11	43	2.7	.39
Alfalfa Hay, Garfield County	1.04	.22	.36	2.48	.353	.32	.82	134	25	10	47	7.4	.11
Alfalfa Hay, McClain County	1.27	.34	.28	3.32	.008	.38	.32	189	21	5	46	1.9	.21
Alfalfa Hay, Stephens County	1.45	.30	.34	2.27	.033	.30	.33	112	22	11	30	1.2	.072
Alfalfa Hay, Grady County	1.47	.20	.45	2.88	.008	.33	.19	136	25	10	43	7.3	.91
Bermuda Hay, Carter County	.60	.37	.32	3.29	.012	.10	.75	124	27	9	77	2.5	.09
Bermuda Hay, Carter County	.60	.23	.18	1.55	.051	.45	.49	101	34	6	46	<1	.10
Bermuda Hay, Carter County	.43	.24	.22	2.26	.028	.43	.68	92	33	6	102	<1	.06
Bermuda Hay, Carter County	.38	.14	.23	1.28	.023	.28	.54	81	23	6	114	<1	.07

Abbreviations:

Ca	Calcium	Na	Sodium	Cu	Copper	Se	Selenium
Mg	Magnesium	S	Sulfur	Mn	Manganese		
K	Potassium	Cl	Chlorine	Zn	Zinc		
P	Phosphorus	Fe	Iron	Mo	Molybdenum		

ASSIGNMENT SHEET 10	*NUTRITION, FEEDS, AND ADDITIVES*	**C-3**

Name _____ Score _____

OBJECTIVE 25

Develop a grazing plan.

EQUIPMENT AND SUPPLIES

- OSU Extension Facts No. 2584
- Calculator
- Calendar

INSTRUCTIONS

Use OSU Extension Facts No. 2584 to answer the questions on the following scenario:

Reading Comprehension
- Gain factual information

Functional Reading
- Interpret graphics and symbols

You have two pastures available between April 1st and December 31st. The pastures are 80 acres native and 40 acres Bermuda, respectively. You have ten wet cows, five dry cows, and ten 300 lb calves. You want to purchase twenty 600 lb calves. Determine the best method for fertilizing your Bermuda pasture.

Operation and Calculation
- Calculate with whole numbers

Math Application
- Solve word problems

Data Analysis and Display
- Interpret charts and tables

☞ **NOTE:** The nitrogen rates on Table 2 represent the pounds of nitrogen applied per acre. The column under the 0 represents the annual forage yield if you don't use any fertilizer. The column under the 50 represents the annual forage yield if you apply 50 pounds of fertilizer per acre.

Life Science
- Investigate health issues

1. How many days will the cattle graze on the two pastures?

   _____

2. How many pounds of dry matter does a wet cow consume per day?

   _____

3. How many tons of forage does one acre of native range produce per year?

   _____

4. How many total pounds of forage are needed per day to support the ten wet cows, the ten 300 lb calves, and the five dry cows?

_____

5. How much additional forage per day will be needed if you purchase the twenty 600 lb calves?

_____

6. What is the forage production of the 80 acres of native grass?

_____

7. What is the forage production of the 40 acres of Bermuda grass without fertilizing?

_____

8. How much extra forage would you have if you did not purchase the twenty additional 600 lb calves?

_____

9. a. Can you support the additional twenty calves without using fertilizer? Explain your answer.

_____

_____

_____

_____

b. How much forage would you have if you apply 50 lbs of fertilizer per acre to the Bermuda grass?

_____

c. Would it be enough to support the additional twenty 600 lb calves?

_____

d. Would you be better off using 100 lbs of nitrogen fertilizer per acre? Explain your answer.

ASSIGNMENT SHEET 11	*NUTRITION, FEEDS, AND ADDITIVES*	**C-3**

Name _____ Score _____

OBJECTIVE 26

Analyze nutritional problems according to species.

EQUIPMENT AND SUPPLIES

- Information on nutritional deficiencies from Assignment Sheet 1

INSTRUCTIONS

Use the information from Assignment Sheet 1 to identify the following nutritional deficiencies and diseases.

Reading Comprehension
- Gain factual information

Life Science
- Investigate health issues

1. A disease of cattle and sheep caused by overeating and overdrinking that results in extreme pain, fever, and a reluctance to move.

   _____

2. A disease caused by a vitamin A deficiency that affects all farm animals.

   _____

3. A condition of young farm animals caused by a lack of calcium, phosphorus, or vitamin D that results in an enlargement of the knee and hock joints, irregular bulges at the juncture of ribs with breastbone, and bowed legs.

   _____

4. A condition that affects cattle; caused by deficiencies of protein and other nutrients in conjunction with weather stress.

   _____

5. A condition that affects all ruminants; caused by an inability of the animal to get rid of ruminal gas.

   _____

6. A condition that affects all warm-blooded animals; generally caused by an iron deficiency.

_____

7. A condition that affects feedlot cattle; caused by a sudden shift from a high-roughage to a high-concentrate ration.

_____

8. A condition that affects cattle and sheep; caused by low blood calcium.

_____

9. A condition that affects all animals; generally caused by inadequate phosphorus that results in lack of appetite, stiffness of joints, failure to breed regularly, decreased milk production, and an emaciated appearance.

_____

10. A condition that generally affects young swine caused by low zinc level or high calcium level that results in a mangy appearance, reduced appetite, diarrhea, and vomiting.

_____

11. A condition that affects calves and lambs that results in lameness or inability to stand, and heart failure caused by selenium deficiency.

_____

OBJECTIVE SHEET

VACCINATION AND DRUGS

C-4

INTRODUCTION

Vaccination and drugs are essential in today's competitive market to maintain animal health and maximize productivity. Without the technology that is available at a reasonable cost to livestock producers, losses due to death, disease, and poor growth would put many producers out of business.

Research and technology for using drugs and chemicals to promote animal health and growth are in active pursuit for better, cheaper medications. There are many career opportunities in veterinary pharmaceuticals, from research to manufacturing to sales.

This unit is closely tied to the prerequisite units listed below. Use them for reference and to help you understand the importance and use of various drugs in livestock production.

PREREQUISITES

Unit B-5, "Birth Assistance"
Unit C-1, "Animal Health Care"
Unit C-2, "Livestock Diseases and Parasites"

FOCUS ASSIGNMENTS

Reading Comprehension
- Gain factual information
- Analyze cause and effect
- Draw conclusions

Language
- Use standard grammar, spelling, and capitalization
- State ideas clearly

Composition
- Use complete sentences

FOCUS ASSIGNMENTS	
PREREADING:	Read Handout 1, "What Makes This Cattle Herd So Efficient?" by John Leidner, published in the February, 1994 issue of *The Progressive Farmer*.
WRITING:	Write a short (one paragraph to one page) essay that summarizes the management practices that make Butch Lovelady's operation successful.

UNIT OBJECTIVE

After completing this unit, you will show the following competencies by mastering the activities on the Assignment and Job Sheets and by scoring at least 85% on the Written Test.

SPECIFIC OBJECTIVES

1. Choose the word or phrase to complete statements about immunity, vaccination, and drugs.
2. Select from a list true statements about types of animal health products.
3. Choose the word or phrase to complete statements about standard medications.
4. Select from a list label requirements for animal health care products.
5. Interpret information on animal health product labels. (Assignment Sheet 1)
6. Complete guidelines for using animal health products.
7. Discuss anaphylaxis.
8. Select from a list factors to consider when calculating mixes or determining dosage levels for animal health products.
9. Calculate mixes and dosage levels for animal health products. (Assignment Sheet 2)
10. Match methods of administering medicine to their descriptions.
11. Match equipment used to administer livestock medications and monitor health care to their descriptions.
12. Drench an animal. (Job Sheet 1)
13. Administer paste. (Job Sheet 2)
14. Administer a bolus. (Job Sheet 3)
15. Install an insecticide ear tag. (Job Sheet 4)
16. Select from a list guidelines for giving injections.
17. Label the parts of a syringe.
18. Discuss guidelines for syringe use and care.
19. Match types of injections to their descriptions.

20. Identify injection sites.

21. Fill a syringe. (Job Sheet 5)

22. Give an intramuscular injection. (Job Sheet 6)

23. Give a subcutaneous injection. (Job Sheet 7)

24. Discuss using growth stimulants.

25. Select from a list true statements about legal and ethical aspects of using growth hormones.

26. Select from a list true statements about administering growth stimulants.

27. Choose the word or phrase to complete statements about growth stimulants.

28. State methods other than growth stimulants that improve the rate and efficiency of gain.

29. Implant cattle and sheep. (Job Sheet 8)

30. Report on new technology and developments in vaccinations and drugs. (Assignment Sheet 3)

INFORMATION SHEET

VACCINATION AND DRUGS

C-4

OBJECTIVE 1

Optional Activities/ Resources

- Look at the vaccination and animal health products you keep in stock for your program. Discuss what they are used for and how they are administered.
- Compare human immunity with animal immunity, including human diseases such as measles, smallpox, polio, and tetanus.
- Invite a veterinarian to discuss drugs in general and the legal and ethical factors that affect their use.

Choose the word or phrase to complete statements about immunity, vaccination, and drugs.

WORDS YOU SHOULD KNOW	
antibody	a protein-like substance produced in the animal's body to combat organisms (antigens) from an infectious agent, such as disease or vaccination
antigen	a protein-like substance that stimulates the growth of antibodies
ELUD	extralabel use of drugs; using drugs in a manner not prescribed on the label
hormone	a chemical produced by an endocrine gland, secreted into the blood, and carried to another organ or part of the body where it produces a specific effect; for example, prolactin is produced in the pituitary gland and stimulates milk secretion
immunity	having resistance to disease
pathogen	a disease-producing organism
phagocyte	a type of white blood cell that consumes microorganisms or other cells
residue	chemicals that remain in the tissues after treatment
vaccination	injecting controlled amounts of microorganisms or their products into an animal to create immunity to specific diseases
withdrawal period	the length of time that a feed additive or drug must not be administered to a meat animal prior to slaughter to insure there are no residues

- Before any drug can be administered to livestock or poultry, it must be thoroughly tested and approved by the Food and Drug Administration (FDA).

- The use of drugs can be very effective in increasing your rate of production and still be safe for consumers if they are used correctly. If they are not used correctly, you could be putting products on the market that might endanger public health.

- There are over a thousand drug products approved by the Food and Drug Administration (FDA). Many are available from your local supplier, and others must be prescribed by a veterinarian.

- As a livestock producer, you will have to choose the right drugs to get the highest production rate and efficiency, while protecting the consumer and complying with FDA regulations.

- As you learned in Unit C-2 "Livestock Diseases and Parasites," infectious diseases are caused by microorganisms: bacteria, viruses, protozoa, and fungi. The animal's own immune system, supplemented by vaccines and drugs are our weapons against these organisms and also against parasites.

- In Unit C-1, "Animal Health Care," you saw several examples of health care plans. The vaccination schedule, determining when and for which diseases to vaccinate, is a critical factor in planning health care.

  ☞ **NOTE:** See Handouts 2 and 3 for information on proper times for vaccination.

- In this unit, we will be looking at drugs such as vaccinations that are used to maintain health, drugs such as antibiotics and anthelmintics that are used to fight disease and parasites, and drugs such as growth hormones that are used to improve and increase the speed of production.

- **The immune system**

  - When a disease pathogen invades an animal, the body reacts in two ways:

    - Phagocytes in the blood stream engulf or attack and kill the bacteria or virus.

    - The body develops antibodies against the specific organism to fight the disease.

- Once the antibodies are present, the animal has an immunity to that disease and will be able to resist it to some degree when the animal is exposed again. Vaccination uses this principle to create and sustain immunity.

- **natural immunity** – inherited resistance to disease

- **acquired immunity** – resistance to disease developed actively or passively

  - **active immunity** – having antibodies present in the blood; acquired after being exposed to antigen-producing organisms; develops slowly, taking from a week to a month, and lasts a long time

  - **passive immunity** – acquired by directly transferring antibodies from an animal with the immunity to an animal without it, such as the dam passing antibodies to the newborn or injecting fluid containing the antibodies, called antiserum, from a highly immune animal into an animal with low immunity; passive immunity is temporary

- As a young animal grows older, the passive immunity it received from its mother decreases. The animal is then vaccinated so it can develop an active immunity to prevent certain diseases during its adult life.

- **Vaccines**

  - Vaccines are substances that contain live, modified, or dead organisms or their products. When a vaccine is injected into an animal, the animal's body builds up antibodies against that organism and increases the animal's immunity against diseases caused by the organism.

  - Vaccines are preventive controls for specific diseases and their specific causes.

    EXAMPLES: anthrax, blackleg, bluetongue, brucellosis, leptospirosis, swine erysipelas

  - **Types of vaccines**

    - **bacterial or bacterin** – vaccine that protects against diseases caused by bacteria

- **viral** – vaccine that protects against diseases caused by viruses

- **killed virus** – vaccine produced by infecting an animal, animal tissue, chick, or embryo with a specific virus which is harvested at the height of infection and subjected to killing agents

  ☛ **NOTE:** The dead virus stimulates the production of antibodies when injected into an animal.

- **live virus** – vaccine produced by growing a live population (culture) of the virus

- **modified live virus** – vaccine made from a virus that has been passed through another host; the virus can no longer produce disease, but it will produce antibodies

  EXAMPLE: passing hog-cholera virus through rabbits to decrease its disease-producing capability

- **monovalent** – produces immunity to only one disease

- **polyvalent** – produces immunity against two or more diseases

• **Drugs**

☛ **NOTE:** Vaccines are drugs. See objective 2 for more specific information about drugs and animal health care products.

- Drugs are substances that aid the body's natural defenses to promote recovery or to relieve pain. They produce desirable changes in the body, but can also produce negative reactions.

  ☛ **NOTE:** See objective 7 for information about anaphylactic shock, a common reaction to vaccines and drugs.

- Drugs can be manufactured from various animal glands and tissues, synthesized by combining chemicals, and grown from living microorganisms.

- Until you know what you are doing through training and experience, you should always consult a veterinarian before administering drugs to your livestock.

- Some vaccines and drugs are available to you over the counter at your local supplier; others are prescribed by veterinarians. Distribution and administration of veterinary drugs are restricted by federal law.

- Illegal uses of veterinary drugs for which you can be prosecuted:

  - ELUD by nonveterinarians at their own initiative
  - mixing drugs into medicated feeds
  - using a drug on a species not prescribed on the label or in conditions for which it is prohibited

    EXAMPLE: giving certain sulfur-based drugs to lactating dairy cattle

  - failure to meet withdrawal periods for meat animals so that residues are present in the meat
  - using drugs that have been withdrawn from the market, such as the formerly-popular growth hormone, diethylstilbestrol (DES)

OBJECTIVE 2

Select from a list true statements about types of animal health products.

Required Activities/Resources
- Read the section on types of immunity and types of biological products in *Vaccines – Their Use, Handling, and Care*, OSU Facts Sheet No. 9100.

Optional Activities/Resources
- Count and analyze animal health products advertised or discussed in a magazine related to animal production.
- Handouts 2 and 3
- Look at catalogs of various veterinary pharmaceutical manufacturers and distributors.

📖 You will read the section on types of immunity and types of biological products in *Vaccines – Their Use, Handling, and Care*, OSU Facts Sheet No. 9100.

✍ **NOTE:** Many types of animal health products are on the market today, and new products are constantly becoming available. There are strict regulations for the use of additives and other drugs. These regulations should be adhered to for the safety of the animal and the consumer. Consult your veterinarian about planning an effective disease/parasite prevention program or feed additives program for your specific livestock operation.

WORDS YOU SHOULD KNOW	
anthelmintic	a drug used to expel intestinal worms
antitoxin	a substance that can neutralize a specific poison
delivery	means of administering drugs
inflammation	the body's response to injury from harmful bacteria or virus or to external injury such as a wound or insect bite; characterized by redness, pain, heat, and swelling
pathogen	disease-producing organism
therapeutic	pertaining to the treatment of disease

- **Types of animal health products**
  - **pharmaceuticals** – products used to treat disease or infection once illness occurs
    - **antibiotics** – produced by living organisms; inhibit or destroy specific microorganisms; will not attack viruses
      - Broad-range antibiotics, will protect against a number of different pathogens. Narrow-range antibiotics are effective only for specific pathogens.
      - Antibiotics are also used to increase growth because they increase food and water intake and may improve digestion and absorption of some nutrients, improving the efficiency of the animal.
      - Sulfonamides (sulfa drugs) are man-made antibiotics that interfere with nutrients required for the growth and reproduction of bacteria; will not attack viruses.
    - **corticosteroids (adrenocorticoids)** – hormones obtained from the adrenal gland; reduce inflammation
    - **antihistamines** – drugs that oppose the action of histamine, a substance in the body that produces inflammation

- **coagulants** – agents that promote the clotting of blood
- **anticoagulants** – agents that inhibit the clotting of blood
- **anesthetics** – drugs that produce insensibility to pain
- **antiseptics** – agents for cleaning and disinfecting around a wound or at the site of a surgical procedure or injection

- **biologicals** – products derived from a living source; used to prevent disease; vaccines are the most common biologicals

  EXAMPLES: bacterins, antiserum, antitoxin

- **parasiticides/insecticides** – products used to control livestock parasites; applied directly to the animal or to the animal's surroundings or taken internally

  EXAMPLES: external parasiticides: sprays, pour-ons and dips; internal parasiticides: anthelmintics such as worm paste

- **vitamins and minerals** – products used therapeutically to prevent or treat symptoms caused by disease or stress

  EXAMPLE: Vitamins A, D, and E are sometimes given as a preventive measure to help cattle through the stress of a hard winter.

- **hormones** – products used therapeutically to correct malfunctions or to stimulate normal functions

  EXAMPLE: Oxytocin is given to stimulate uterine contractions during a difficult birth to help an animal expel the fetus.

- **Methods of delivery**

  - **pour-on or dipping** – liquid parasiticides are applied directly to the hair and skin

    ☛ **NOTE:** Pour-on products are placed in a small area and the medication migrates to other areas as the animal moves and rubs against objects or other animals. Some products are absorbed into the bloodstream.

- **back scratchers or rubbers** – bags saturated with an oil-base insecticide suspended between two posts so that cattle can rub their backs against them

- **sprays** – concentrated liquid pesticides mixed with water and applied under pressure through nozzles that break the liquid into tiny droplets

- **wettable powder** or **dust** – substance that can be mixed with or easily dissolved in water

- **oral administration** – pills, liquids, or pastes swallowed by the animal

  ☞ **NOTE:** See objective 10 for more specific information.

- **injections** – liquids placed under the skin, into a vein, into the muscle or other areas using a needle and syringe

  ☞ **NOTE:** See objectives 16-20 for more specific information.

- **insecticide ear tags** – pieces of plastic saturated with insecticide are placed through the animal's ear; through heat from the sun, the animal's movement, and contact with other animals, the medication is transferred to the hair coat and then migrates over other parts of the body

- **implants** – pellets containing growth hormone or other medication are injected under the skin of the ear; used on beef animals

  ☞ **NOTE:** Pellets are placed in the ear because the ear is not used for meat when the animal is slaughtered.

- **intranasal** – the vaccine is placed directly into the nasal opening; used on poultry, cattle, and sheep

- **intraocular** – the vaccine is placed directly into the eye; used on poultry

OBJECTIVE 3

Optional Activities/Resources
- Handouts 2 and 3 on recommended vaccination times, if not already distributed
- Refer to Unit C-2, "Livestock Diseases and Parasites" for information about the diseases.
- Refer to a good animal health reference and learn how to use it.

Choose the word or phrase to complete statements about standard medication.

WORDS YOU SHOULD KNOW	
subclinical	early or mild stages of a disease in which symptoms are not noticeable; low-level infections or infections without symptoms

☛ **NOTE:** Have Unit C-2, "Livestock Diseases and Parasites" available while you study this objective.

- **Vaccines** (Table 1)

  ☛ **NOTE:** See Handout 2 for recommended vaccination times.

  - Vaccinate against
    - anthrax
    - blackleg
    - leptospirosis
    - vibriosis
    - rednose/pink eye
    - enterotoxemia
    - erysipelas
  - Vaccinate against other diseases prevalent in your area.

    ☛ **NOTE:** The number of cases of rabies is increasing every year. Rabies vaccinations for some livestock may be recommended. Consult your vet.
  - Vaccinate animals that have been exposed to specific diseases.
  - Vaccinate only healthy animals.
  - Do your research and call your vet: with some diseases if an animal is diseased, the rest of the herd or flock should be vaccinated. With other diseases when one animal is diseased, the rest should NOT be vaccinated.

TABLE 1

VACCINES		
Species	**Use**	**Method of Application**
cattle sheep swine	blackleg, leptospirosis, malignant edema, brucellosis, enterotoxemia[1], Johne's disease, foot and mouth disease, mastitis (bluebag in sheep), rabies, tetanus	injection
cattle	anaplasmosis, IBR (infectious bovine rhinoracheitis, PI_3 (parainfluenza$_3$), pasteurella, BVD (bovine virus diarrhea), calf scours[1], infectious embolic meningoencephalitis, cowpox, pink eye	
sheep	bluetongue, overeating disease, sore mouth, flukes, foot rot[2], EAE (enzootic abortion of ewes), pink eye, shipping fever, ram epididymitis, bacillary hemoglobinuria	
swine	erysipelas, TGE (transmissible gastroenteritis), enteric colibacillosis[1], porcine parvovirus, pleuropneumonia[2]	
poultry	Marek's disease, infectious bronchitis, Newcastle disease, fowl pox, epidemic tremor	injection, drinking water, dust, spray, wing-web

[1] The dam is vaccinated while in gestation. Immunity is passed to the offspring.
[2] The vaccine is not always effective; more research is needed.

- **Antibiotics** (Table 2)
  - Antibiotics are used to treat a wide range of diseases and conditions, including parasite infestation.
  - Animals on high-energy rations and on low-energy rations will show an increase in daily rate of gain and in feed efficiency when they receive a steady low level of antibiotic in their daily feed.

    ☞ **NOTE:** See objectives 24-27 for more information.
  - Factors that influence their effect on rate of gain and feed efficiency
    - inhibit growth of organisms that produce toxins and waste products
    - increase intake of feed and/or water

- affect the microorganisms in the digestive tract that influence the absorption of nutrients
- improves digestion and absorption of nutrients
- control pathogenic organisms that could cause subclinical diseases
- affect the metabolism

- High levels of antibiotics in feed are used to
  - treat diseases over a short period of time
  - prevent and treat stress associated with transportation and adaption to a new environment
- Antibiotics may be injected to treat disease. The type and site of the injection will vary with the purpose.
- Antibiotics can be combined with other antibiotics or with hormones.

  EXAMPLES: Oxytetracycline/chlortetracycline and oxytetracycline/neomycin combinations can be used to treat dairy calves for diarrhea.

  Chlortetracycline and sulfamethazine combination may promote growth and protect against respiratory disease.
- There are many antibiotics used in low- and high-level dosages, with specific applications for specific animals and disease conditions.

  ☞ **NOTE:** Refer to *Modern Livestock and Poultry Production* (Gillespie, 4th edition) for more specific and complete information.
- Antibiotics and sulfa drugs are selective:
  - a drug that may be effective against one disease may not be effective against another disease
  - a drug that will kill a disease in one species may not kill the same disease in another species
- Antibiotics may have withdrawal periods before slaughter; always check the label.

- Common antibiotics (Table 2)

NOTE: This is only a small selection of the many antibiotics available. It is intended to make you aware of some of the most comm antibiotics, and not as a guide for treatment. Remember hat each drug has specific uses for specific animals. Until you know how to use certain drugs and what they can do, you should consult a veterinarian and always have a good animal health reference book available.

TABLE 2

COMMON ANTIBIOTICS			
Antibiotic	**Type of animal**	**Low level**	**High level**
chlortetracycline (Aureomycin)	beef calves, beef cows, and nonlactating dairy cows (different applications); sheep; poultry	rate of gain, feed efficiency	diarrhea, respiratory disease, foot rot, liver abscesses; egg productivity in poultry
erythromycin (Gallimycin)	feedlot cattle, poultry	rate of gain, feed efficiency	egg production and respiratory disease in poultry
neomycin	beef and dairy cattle, sheep, poultry	feed efficiency	diarrhea in cattle, sheep and poultry; enterotoxemia in sheep; bacterial enteritis in poultry
oxytetracycline (Terramycin)	all livestock	rate of gain, feed efficiency	diarrhea in all livestock; entero-toxemia in sheep; bacterial enteritis in swine; respiratory disease in poultry
penicillin (Procane)	all livestock	rate of gain, feed efficiency	respiratory disease and bacterial enteritis in poultry
Ethlenediamine dihydroidide (EDDI)	all livestock except nonlactating dairy cows	control foot rot in cattle; lumpy jaw in cattle and sheep; respiratory disease in poultry and swine	

- **Parasiticides and insecticides**

  - Be sure of the diagnosis before you use any parasiticide or insecticide.

  - Consult a veterinarian and use a good animal health reference to determine the proper treatment.

  - **internal parasiticides** – use the specific product for the type of parasite in the specific animal

    EXAMPLES: roundworms in swine: piperazine, dichlorvos, levamisole, sodium fluoride, cadmium compounds;

    lungworms in sheep: copper-sulphate-nicotine, phenothiazine;

    coccidiosis in cattle: sulfa drugs and antibiotics

  - **external parasites and insecticides** – You can use chemical, biological, mechanical, and environmental controls. Chemical controls are the most economical. They require strict observation of the current regulations about mixing, application rates and methods, and restrictions. Regulations are subject to frequent change, so you should consult your extension agent, veterinarian, or local supplier for current information.

    EXAMPLES: permethrin: controls horn flies, stable flies, face flies, house flies, lice, ticks, sarcoptic mange on cattle and swine; fowl mites on poultry; can be applied as a spray, dust, dip, ear tags

    famphur: grub control on cattle

    lindane compound (USDA EQ-335): screwworm, wool maggots, maggots in a wound

OBJECTIVE 4

Select from a list label requirements for animal health care products.

Optional Activities/Resources
- Study and compare the information on labels of products used in your program or that you bring from home.

☑ **NOTE:** Label requirements for animal health products are established by one of three federal agencies: the Food and Drug Administration (FDA), the Environmental Protection Agency (EPA), or the United States Department of Agriculture (USDA). On some products, additional information may be required, but these items are common to all animal health products.

- name and address of manufacturer
- statement of net contents
- statement of active and inert ingredients present
- full and complete directions for use
- registration number
- antidote statement, when applicable
- precautionary information adequate for safe use
- tables or information for calculating mixes or determining dosage level

OBJECTIVE 5

Complete Assignment Sheet 1.

OBJECTIVE 6

Complete guidelines for using animal health products.

Required Activities/Resources
- Read the section on how to handle and care for vaccines in *Vaccines – Their Use, Handling, and Care*. OSU Facts Sheet No. 9100.

Optional Activities/Resources
- Compare the short-term and long-term costs of using products that are too old or that have lost their effectiveness because of improper handling.

📖 You will read the section on how to handle and care for vaccines in *Vaccines – Their Use, Handling, and Care*, OSU Facts Sheet No. 9100.

- Buy only from reputable manufacturers and distributors.
- Reject any product that may have lost its effectiveness.
- Carefully read the complete instructions for product use and follow them faithfully.
- Carefully read precautionary information and follow it faithfully.

- Carefully read all information for calculating mixes and determining dosage levels, and follow it faithfully.

- Wear protective articles, such as protective clothing, gloves, or face mask, when the label recommends them.

- Get an accurate diagnosis before using drugs to treat a diseased animal.

- Use good sanitation procedures and proper equipment when administering drugs.

  ☞ **NOTE:** Strict sanitation is critical. You must not pass unwanted microorganisms or pathogens into the animal's body or from the animal's body into yours.

- Adhere to temperature-range requirements: refrigerate all vaccines, injectable penicillins, and other drugs that require cool temperatures.

  ☞ **NOTE:** Most biologicals lose their strength when they get warm or are exposed to sunlight.

- Store non-refrigerated medications in a cool, dry place in their original containers with their original labels.

  ☞ **NOTE:** Keep them away from extreme temperatures and direct sun.

- Keep medications away from children and animals.

- Properly dispose of a product that has passed its expiration date.

- Dispose of used equipment properly.

  - Use a chemical killing agent or other approved method to destroy live and modified viruses before throwing away the container.

  - Always recap a needle before disposing of it.

  - Put needles and sharp edges into containers made of metal or heavy plastic before throwing them away.

- Dispose of empty containers according to directions on the label.

OBJECTIVE 7

Discuss anaphylaxis.

Optional Activities/Resources
- Research epinephrine and learn where it comes from, what it does, and how it works.

WORDS YOU SHOULD KNOW	
anaphylaxis	increased sensitivity to the introduction of foreign proteins in the animal's body
local	affecting a specific part of the body
serum	the clear, fluid portion of the blood without the cells or clotting factors
systemic	affecting the entire body

- Anaphylaxis, or anaphylactic shock, is a reaction that may occur when an animal is repeatedly injected with a specific drug (foreign protein) or a drug similar to one previously administered. Repeated doses of bacterins, serums, vaccines, or antibiotics, or a combination of similar drugs, can cause the animal to have a systemic reaction (anaphylactic shock) or a local reaction (break out in hives, develop hay fever or asthma).

- The number of cases of anaphylaxis is increasing because of the increased use of vaccines and injectable pharmaceuticals.

- In most cases, antibodies that form in response to the injection of a foreign protein circulate through the blood and protect the animal from disease. In some cases though, the antibody becomes fixed, attached to the tissue cells. When the animal receives another dose of the same or similar protein, the fixed antibody reacts to it, damaging the tissues.

- The body responds to the tissue damage by releasing histamine. Histamine causes the muscles to relax, especially in the walls of the blood vessels. Blood pressure and blood flow decrease, causing symptoms of local or systemic anaphylaxis.

- Symptoms of anaphylactic shock
  - glassy eyes
  - grinding of the teeth
  - muscular tremors or shivering

- ▫ rapid breathing
- ▫ staggering gait
- ▫ collapse followed by death

- Anaphylaxis may occur within minutes of the repeat injection or may not occur for hours.
- Treatment with an injection of epinephrine solution usually results in immediate recovery.

OBJECTIVE 8

Optional Activities/Resources
- Read and compare dosage levels and mixing instructions for several similar and dissimilar products.

Select from a list factors to consider when calculating mixes or determining dosage levels for animal health products.

☞ **NOTE:** Always follow the product label recommendations for calculating mixes and determining dosage level; otherwise you may cause harm – or even death – to the animal being treated or to the humans involved in administering the product.

- method of applying the product

  EXAMPLES: drench, spray, injection

- unit of measure to be used for the size of the animal being treated

  EXAMPLES: Cubic centimeters per hundred pounds of body weight; fluid ounces of drench mixture per hundred pounds of body weight

- species of animal being treated

  ☞ **NOTE:** Some products are to be used only for beef cattle, some only for dairy cattle, or swine, or sheep.

- age, sex, and state of the animal being treated

  ☞ **NOTE:** When determining the state of the animal, consider both the animal's state of production and the animal's present physical state. For example, some medicines cannot be given to lactating dairy cows and some strong medicines cannot be given in conjunction with dehorning or castration.

- types of substances being mixed

  EXAMPLE: Oil-base medications and water-base medications don't mix.

OBJECTIVE 9

Complete Assignment Sheet 2.

OBJECTIVE 10

Match methods of administering medicine to their descriptions.

Required Activities/Resources
- Study objectives 10 and 11 together.

WORDS YOU SHOULD KNOW	
aqueous solution	the drug is in a water base
bolus	a large pill
interdermal	between the layers of skin
intra	a prefix meaning *within*, as in intramuscular or intrauterine

☛ **NOTE:** When administering medicine to livestock, *always* restrain the animal, both for its safety and your own. Also, *always* read all of the label literature and cautions. A mistake in the type of medication or amount could cost you an animal.

- **topical** – applied to the skin or the mucous membranes of the eyes, ears, or nasal passages

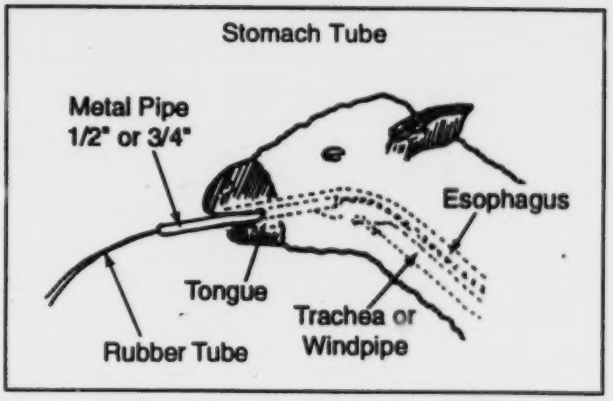
  ☛ **NOTE:** The body absorbs the chemicals when the medicine is applied topically. Make sure that the medicine is nontoxic.

  EXAMPLES: ointments, aqueous solutions, powders, aerosols

- **oral** – given by mouth

  - **ingestion (feeding)** – adding medicines to the feed or water
  - **drenching** – placing the liquid in the back of the animal's mouth, usually with a drenching gun
  - **tubing** – inserting a tube into the animal's esophagus or stomach (Figure 1)

FIGURE 1



☞ **NOTE:** If the tube is incorrectly placed and the fluid goes into the lungs, the animal can get pneumonia or die. Do not attempt to tube an animal until you have watched and learned the correct procedures.

- **using a dose syringe** – forcing medicine down the throats of animals and poultry using a syringe with a long pipe or nozzle

- **anal or rectal** – introduced into the rectum

  EXAMPLE: suppository

- **nasal** – introduced into the nose

  EXAMPLE: spray for hogs or calves with respiratory virus

- **injectable** – placed directly into the animal's body with a needle and syringe

  ☞ **NOTE:** Injections have several advantages over oral methods. They get the medication into the system quickly; substances are not affected by digestive juices; and smaller doses are used because they are not diluted by food or water.

  EXAMPLES: intravenous, intramuscular, intradermal

- **intrauterine** – introduced directly into uterus

  EXAMPLE: antibiotic bolus placed in the uterus after calving problems

- **intramammary** – introduced into the teat to treat mastitis

- **rumen inoculation** – pumping or pouring the rumen liquid from a healthy animal through a drenching tube into the rumen of a sick animal; used on sheep and cattle

OBJECTIVE 11

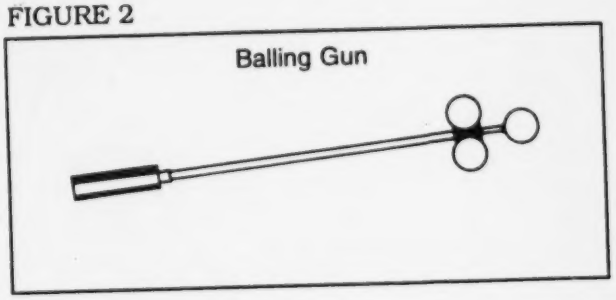
Match equipment used to administer livestock medications and monitor health care to their descriptions.

Optional Activities/Resources
- Equipment used to administer livestock medications and monitor health care: explanation and demonstration of their use
- Talk to a local supplier about various types and sizes of equipment and their uses.

☞ **NOTE:** Dip equipment in a disinfectant solution between use on different animals. Also, use care when placing equipment or medication in an animal's mouth. You don't want to be bitten, and you don't want equipment or medication to enter the animal's lungs. Proceed slowly, allowing the animal plenty of time to swallow.

- **balling gun** – used to administer pills, capsules, or boluses orally (Figure 2)

FIGURE 2

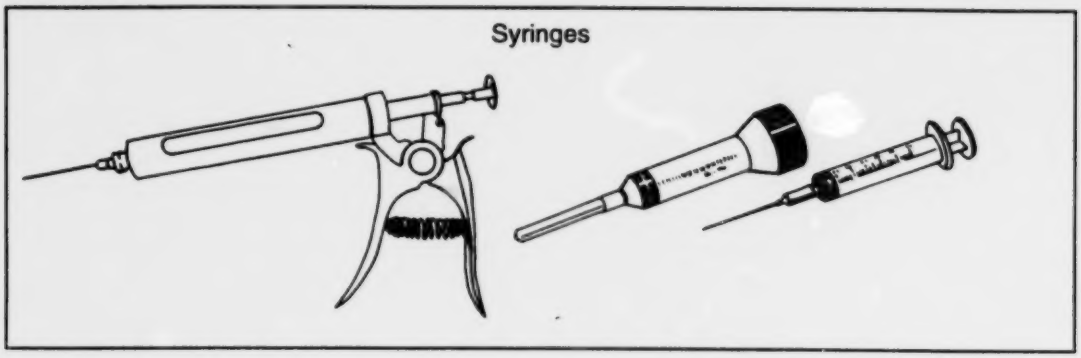


- **syringe** – used with a needle to administer liquid injectables (Figure 3)

☞ **NOTE:** There are many types of syringes, and needles come in a variety of diameters and lengths. The size states the diameter first, then the length: 16-gauge, 1-inch.

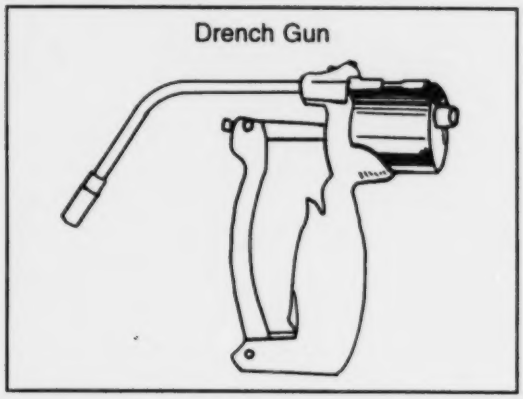
IMPORTANT: The smaller the needle's gauge number, the larger the needle's diameter. Needle sizes 22-gauge, 1-inch, and 18-gauge, 1½-inch, are suitable for most injections. Syringes may have both cc (cubic centimeter) and ml (millimeters) measurements on the barrel. *Always* know the unit of measure used on the label and the units marked on your equipment.

FIGURE 3



- **drench gun** – used to administer liquid medications orally; measures doses in cubic centimeters or ounces (Figure 4)

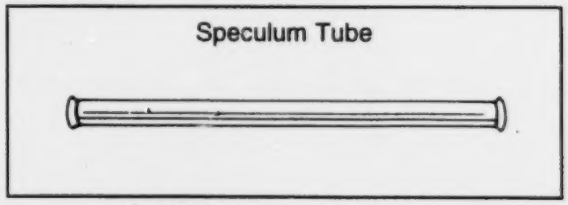
FIGURE 4



- **speculum tube** – twenty-inch metal tube used with a rubber tube to relieve cattle of bloat (Figure 5)

☑ **NOTE:** The speculum tube is placed in the animal's mouth and esophagus, and the rubber hose is passed through the tube into the animal's stomach. This method of bloat treatment should be attempted only after watching and learning the correct procedures.

FIGURE 5



- **trocar and cannula** – two-part device used to relieve bloat in cattle and sheep; when the trocar is withdrawn, the cannula (hollow tube) is left in place to allow gas to escape (Figure 6)

  ☛ **NOTE:** Like the speculum tube, this equipment should be used only after watching and learning the correct procedures: and, more importantly, only after all other bloat relief methods have been unsuccessful. After the trocar and cannula have been used, a veterinarian should be consulted for post-bloat treatment.

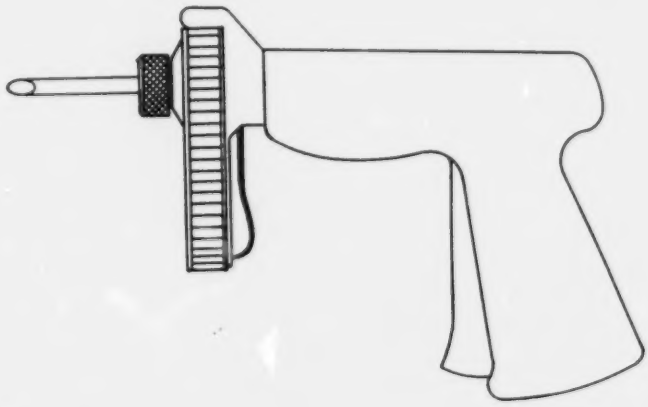
FIGURE 6

Trocar Inside its Cannula

- **implant gun** – used to deposit growth stimulant pellets in the ear (Figure 7)

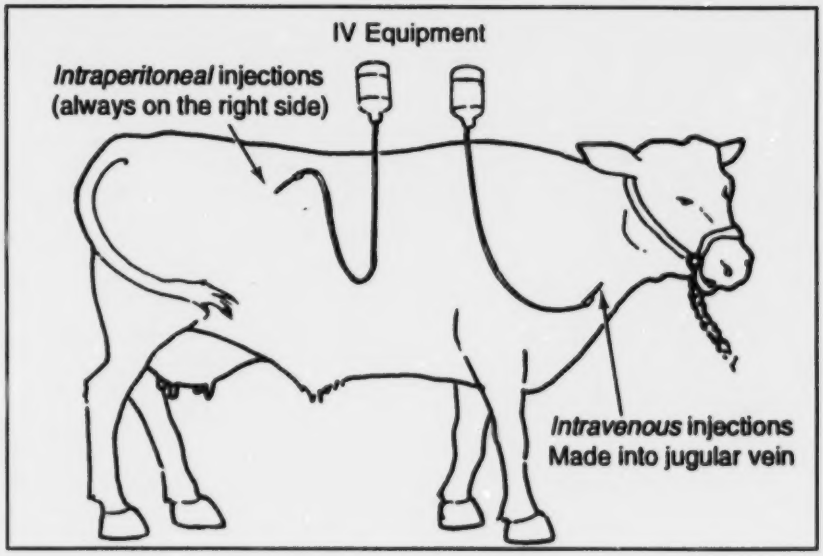
FIGURE 7

Implant Gun



- **IV equipment** – used to administer medicine continually or intermittently over a period of time (Figure 8)

FIGURE 8



OBJECTIVE 12 **Complete Job Sheet 1.**

OBJECTIVE 13 **Complete Job Sheet 2.**

OBJECTIVE 14 **Complete Job Sheet 3.**

OBJECTIVE 15 **Complete Job Sheet 4.**

OBJECTIVE 16 **Select from a list guidelines for giving injections.**

Optional Activities/Resources
- Watch a video on vaccination and/or injections.

- Use a syringe that is clean and in good working order.

  ☞ **NOTE:** Dismantle syringes and boil or chemically sterilize them before and after use. See objective 18.

- Use only the dose directed; do not overdose or underdose.

  ☞ **NOTE:** Biological products and drug solutions are usually measured in "cc's," cubic centimeters. Some products may be measured in "ml's," millimeters or "mg's," milligrams. *Always*

know the unit of measure used on the label and the units marked on your equipment.

- Inject by the proper route and use the proper method.

  ☞ **NOTE:** Injecting some intramuscular drugs intravenously can cause anaphylactic shock and immediate death.

- Check that the needle is not in a vein before injecting the drug. Pull back slightly on the plunger. If blood appears, use another site.

- Inject the drug slowly and remove the needle quickly.

- Fluids to be injected should be at body temperature or lower, never higher.

- Keep vaccine bottles refrigerated before, during, and after use.

  ☞ **NOTE:** Throw away vaccine bottles left unrefrigerated.

- Do not expose live biologicals to sunlight.

- Do not use alcohol to clean an injection site when using a modified live virus vaccine.

  ☞ **NOTE:** Use another type of disinfectant. Alcohol will make a modified live virus ineffective.

- Use more than one injection site if you are injecting more than 10 ml of medication, especially on smaller animals.

- Rotate sites when giving a series of injections to prevent soreness and local inflammation.

- Antibiotics should be administered for a minimum of three days to insure their effectiveness, unless otherwise directed on the label.

- Do not vaccinate meat-producing animals within 21 days of slaughter.

- Never stab or inject in primal cuts; use shoulder or neck muscles.

- Gently massage the injection site to hasten absorption and prevent leakage from the site.

- Be certain that immunity will develop after vaccination.
  - Make sure that the animal is healthy when vaccinated.
  - Administer vaccine correctly.
  - Allow proper time to observe negative reactions from the vaccine.
- Change needles for each animal when anaplasmosis may be a problem in the herd.

  NOTE: Anaplasmosis is a cattle disease caused by parasites.

OBJECTIVE 17

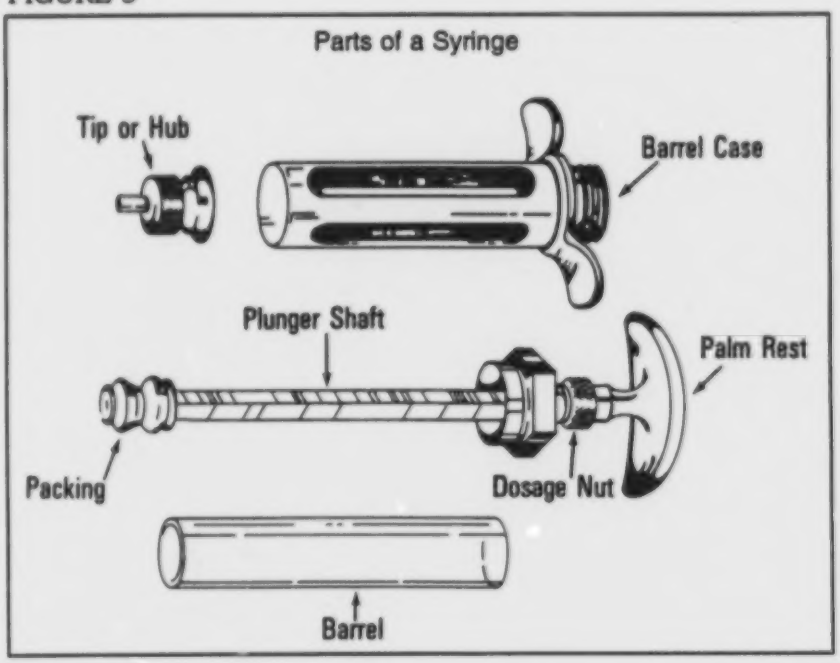
Required Activities/Resources
- Transparency Master 1
- Your instructor will dismantle several types of syringes and allow you to examine, identify, and handle the parts.

Label the parts of a syringe. (Figure 9)

Your instructor will disassemble several types of syringes for you to examine, identify, and handle the parts.

You will see a transparency showing the parts of a syringe.

FIGURE 9



OBJECTIVE 18

Discuss guidelines for syringe use and care.

Optional Activities/ Resources
- Demonstration of how to sterilize and handle a syringe

- Sterilize nondisposable syringes.
  - Dismantle the syringe and boil for 10 minutes.
  - Let it cool completely.
  - Lubricate the packing with glycerin.
  - Reassemble carefully.
- To sterilize with alcohol, fill the syringe with a 70% solution of ethyl alcohol and squirt out the contents. Repeat several times. Be sure the syringe is completely empty before using it.
- Handle a sterilized syringe as little as possible to avoid contamination.
- Sharpen or discard needles when they get dull or develop a burr.

OBJECTIVE 19

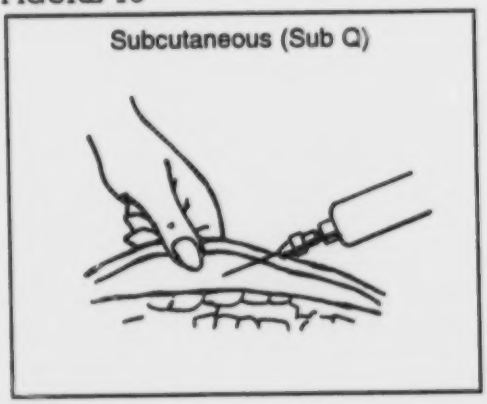
Match types of injections to their descriptions.

Required Activities/Resources
- Study objectives 19 and 20 together.
- Transparency Masters 2-10

You will see nine transparencies showing the types of injections.

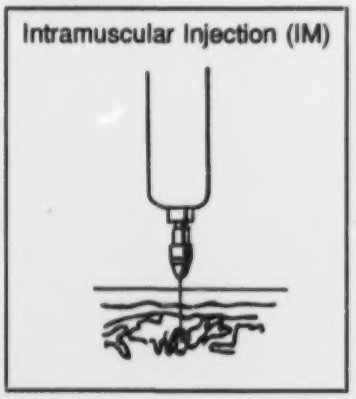
- subcutaneous injection (Sub Q) – made in any area where the skin fits loosely, such as the neck, chest wall, or flank; deposit the dosage under raised skin, and then massage the area to aid distribution (Figure 10)

FIGURE 10



- **intramuscular injection (IM)** – made deeply into large muscles with a needle at least 3/4 inch long (Figure 11)

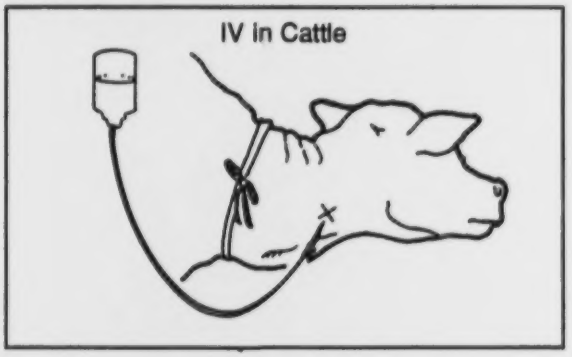
FIGURE 11



- **intravenous (IV) injection in cattle** – made directly into the jugular vein with a 14- or 16-gauge, 1½- to 2-inch needle, with the point toward the animal's heart

☞ **NOTE:** Intravenous injections are the most dangerous to perform. Apply a choke rope to raise the vein so that the needle can be inserted correctly. Be sure that blood flows freely from the needle, and then release the choke rope and attach the syringe or IV tube to the needle to administer the medication. Monitor constantly to make sure that the needle remains in the vein. The drug action will occur 15-60 seconds after the injection. (Figure 12)

FIGURE 12



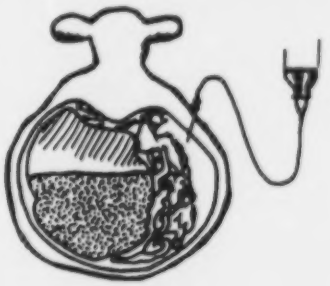
- **intraperitoneal injection (IP) in cattle** – made into the right flank at a point in the center of a triangle formed by the loin,

the last rib, and a line from the top of the last rib to the hip bone (Figure 13)

☛ **NOTE:** Use sterile precautions, a 14- to 16-gauge, 2½- to 3-inch needle, and warm the solution to body temperature before administering.

FIGURE 13

Intraperitoneal Injection (IP) in Cattle

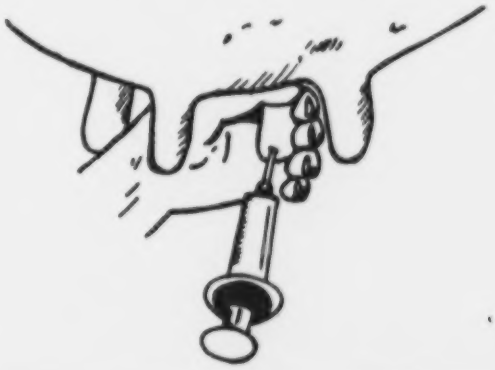


- **infusion intramammary (IMM)** – made with a cannula directly into the teat canal; disinfect the teat and depress it to open the sphincter muscle (Figure 14)

☛ **NOTE:** The teat should be disinfected again after the infusion.

FIGURE 14

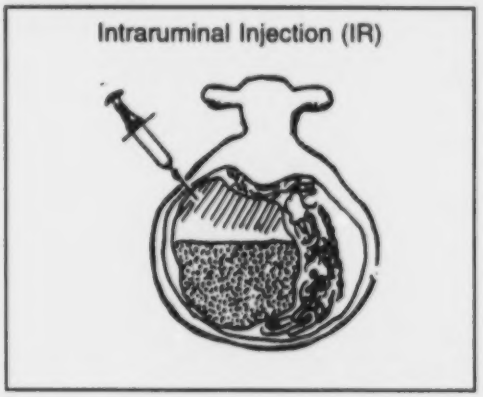
Infusion Iintramammary (IMM)



- **intraruminal injection (IR)** – made through the left flank with a 14-gauge, 3-inch needle (Figure 15)

  ☞ **NOTE:** Intraruminal injection is performed to relieve bloat. The needle has been inserted correctly if gas or liquid from the stomach returns through the needle.

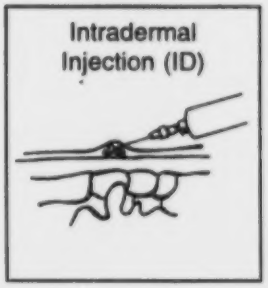
FIGURE 15



- **intradermal injection (ID)** – made into the skin with a 20- to 26-gauge needle (Figure 16)

  ☞ **NOTE:** An intradermal injection should raise a blister. Shave the animal's hair prior to injection.

FIGURE 16



- **wing-web injection** (poultry) – vaccine is injected into the skin on the underside of the wing web at the elbow using a grooved, double needle instrument

OBJECTIVE 20

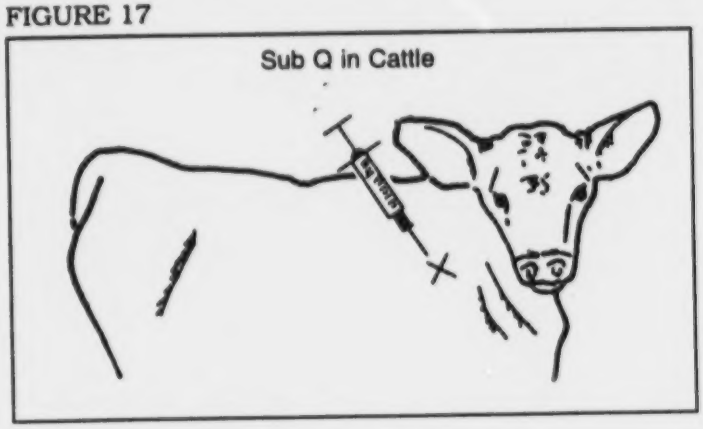
Required Activities/ Resources
- Demonstrate on live animals when possible.

Identify injection sites.

You will see ten transparencies on the types of injections.

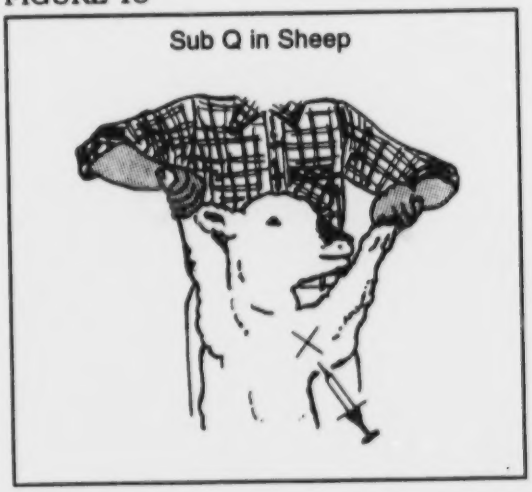
- **subcutaneous (Sub Q)**
  - cattle (Figure 17)

FIGURE 17



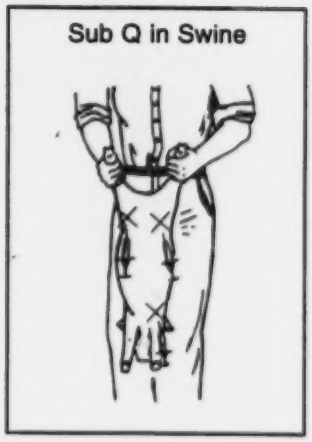
  - sheep (Figure 18)

FIGURE 18



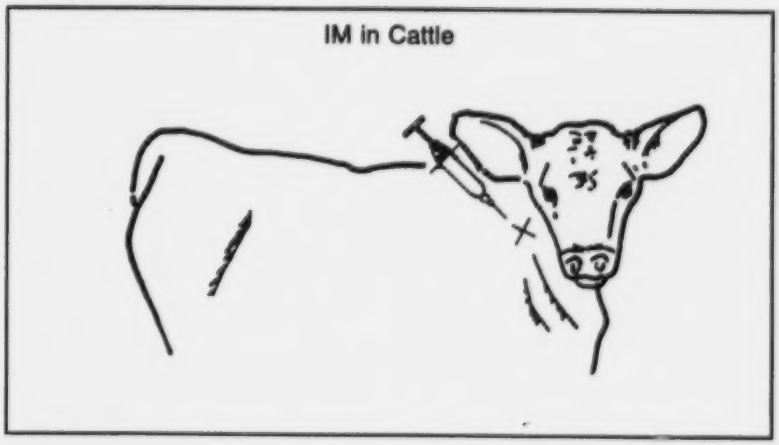
- swine (Figure 19)

FIGURE 19



- **intramuscular (IM)**
  - cattle (Figure 20)

FIGURE 20

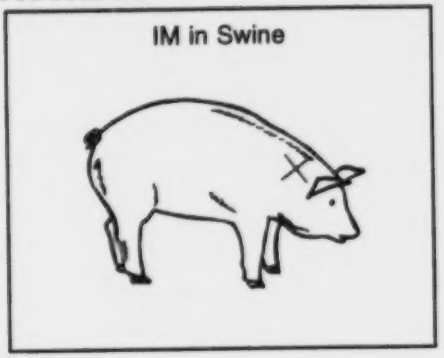


- sheep (Figure 21)

FIGURE 21

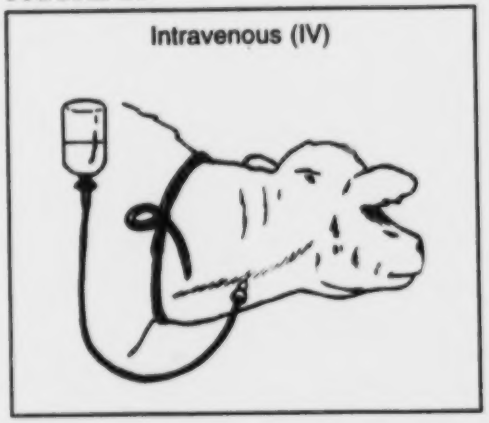
- swine (Figure 22)

FIGURE 22



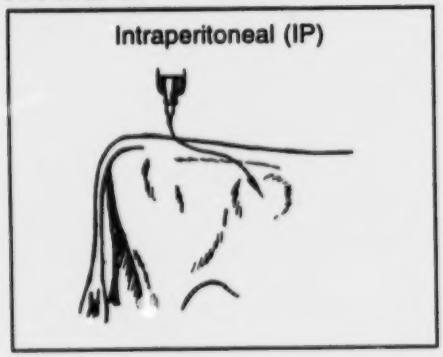
- **intravenous (IV)** (Figure 23)

FIGURE 23



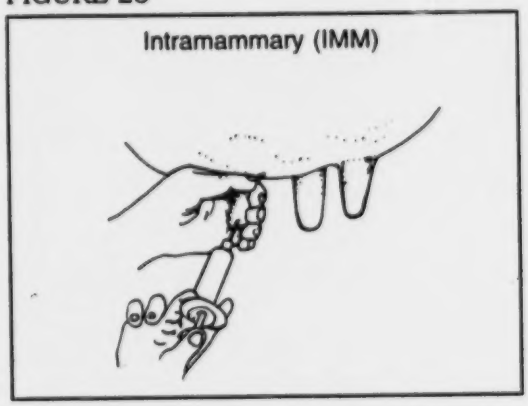
- **intraperitoneal (IP)** (Figure 24)

FIGURE 24



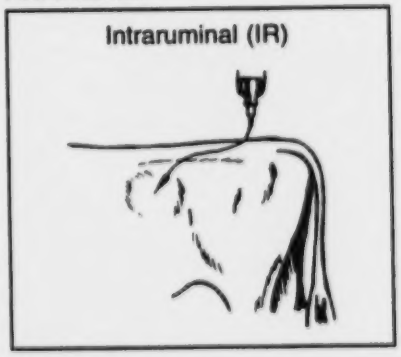
- **intramammary (IMM)** (Figure 25)

FIGURE 25



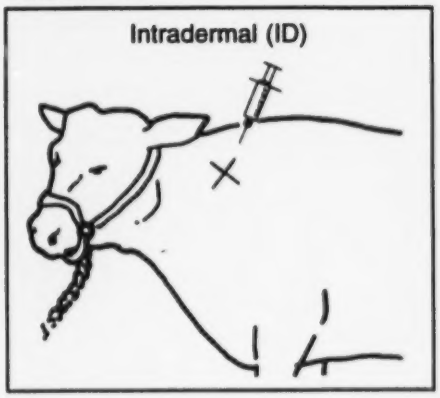
- **intraruminal (IR)** (Figure 26)

FIGURE 26



- **intradermal (ID)** (Figure 27)

FIGURE 27



OBJECTIVE 21 **Complete Job Sheet 5.**

OBJECTIVE 22 **Complete Job Sheet 6.**

OBJECTIVE 23 **Complete Job Sheet 7.**

OBJECTIVE 24 **Discuss using growth stimulants.**

Optional Activities/Resources
- Talk to a livestock producer about the use of hormones.

WORDS YOU SHOULD KNOW	
bullers	livestock that other livestock pick out to mount
prolapse	the displacement of a body part from its normal position
rider	an animal that persistently mounts other animals

☞ **NOTE:** See objective 1 for the definition of a hormone.

- Growth hormones regulate body processes, metabolism, and the growth and size of an animal. If there is too little growth hormone present in the body naturally, the animal will be

small. If there is too much, the animal will be abnormally large or deformed.

- Synthetic, or artificial, hormones can increase the rate of growth and can improve the efficiency of feed and weight gain.
- **Advantages of using growth hormones**
  - increase growth rate
  - decrease feedlot cost
  - improve feed efficiency
  - animals are ready for market sooner
- **Disadvantages of using growth hormones**
  - may affect carcass quality
  - require withdrawal period prior to slaughter
  - may cause bullers or riders, or prolapse of female reproductive organs

    ☞ **NOTE:** Bulling and riding are caused by an excessive rate of absorption of the pellet. If this happens, remove the pellet.

OBJECTIVE 25

Select from a list true statements about legal and ethical aspects of using growth hormones.

Optional Activities/Resources
- Invite a consumer advocate, a veterinarian, and a livestock producer to discuss the legal and ethical aspects of using growth hormones.
- Make a graph with the information in Table 3.
- Use the *Reader's Guide to Periodic Literature* to research recent attitudes and findings on the use of hormones.

- The FDA closely regulates the amount of growth hormone residue allowed in meat. Producers carefully follow recommended dosages and withdrawal times to protect their buyers and to protect themselves from severe penalties.
- Furthermore, the USDA checks animal products closely for traces of residues from food additives or medications.
- Dr. Ray V. Herren, author of *The Science of Animal Agriculture*, says, "The allowable amounts of these residues in foods would have to be hundreds, and in some cases, thousands of times greater before any effect at all could be detected in humans who consume the animal product."

- Some consumer groups have been critical of hormone use, claiming that residues contaminate the meat and are harmful to humans.

- According to the National Cattlemen's Association, there is no scientific evidence that natural or synthetic hormones fed to cattle are harmful to human health.

- The amount of hormone absorbed from meat by the human body is very small. No more than 1% of a human's daily production of hormone is permitted to be present in the daily consumption of meat, and 90% of that is reduced during the digestive process.

- Table 3 compares human hormone levels to estrogen levels in implanted and nonimplanted steers and in various foods, including beef from an implanted animal. You can see that the hormone levels from implanted steers are very low compared to the normal human levels and compared to other foods.

TABLE 3

ESTROGEN LEVELS IN HUMANS, BEEF, AND FOODS		
Daily Human Estrogen Production in Nanograms		
Human		Amount
Female child, before puberty		54,000
Male child, before puberty		41,000
Nonpregnant woman		480,000
Pregnant woman		20,000,000
Adult male		136,000
Estrogen Levels in Implanted and Nonimplanted Beef		
Beef Source	Nanograms per gram of muscle	Nanograms per 3 oz of muscle
Steer, implanted	0.022	1.9
Steer, nonimplanted	0.015	1.3
Estrogen Levels in Foods		
Food	Nanograms per grams of food	Nanograms per 3 oz of food
Beef from implanted steer	0.022	1.9
Wheat germ	40	3,400
Soybean oil	20,000	1,680,000
Milk	0.13	11

Adapted with permission of the National Cattlemen's Association

OBJECTIVE 26

Optional Activities/Resources
- Examine and handle pellets.

Select from a list true statements about administering growth stimulants.

- **Methods of administering growth hormones**
  - in feed
  - by injection; hormones are absorbed quickly
  - implanted in the ear using pellets and a pellet gun; the pellets release a very small amount of hormone over a period of time; absorbed slowly

- transferring genes that cause the production of extra growth hormones

  NOTE: See Unit B-6, "New Technology: Embryo Transfer and Gene Splicing" for more information on genetic engineering.

- **Causes of improper implants**

  NOTE: A poor job of implanting can result in inadequate effects or an excessively rapid rate of absorption. If the pellet is not properly implanted, remove it and repeat the process.

  - crushing the pellet
  - gouging the cartilage of the ear
  - depositing the pellets between layers of skin
  - using a contaminated needle
  - placing the implant too close to the base of the ear

OBJECTIVE 27

Choose the word or phrase to complete statements about growth stimulants. (Table 4)

Optional Activities/Resources
- Discuss the types of hormones used in your region.
- Solve gain and efficiency problems to help you understand how using hormones can be cost effective.

Discuss the types of hormones used in your region.

WORDS YOU SHOULD KNOW	
somatotropin (STH)	a natural secretion of the pituitary gland that affects body cell growth, especially in muscle and bone cells

Growth Hormones and their Characteristics				
Growth Stimulant	**Class of Animal**	**Method of Administration**	**Effects**	**Withdrawal period**
bovine somatotropin (BST)	dairy cattle	implants	increases feed efficiency 10-20% and milk production 10-25%; increases the growth rate of heifers 8-10%	none
porcine somatotropin (PST)	swine	injection	causes lactating sows to produce more milk and wean heavier pigs; finishing hogs have 15-20% faster gain, greater feed efficiency, and increase in lean muscle	none
melengestrol acetate (MGA): a synthetic progestogen hormone, similar to progesterone	finishing heifers	oral	increases the daily rate of gain by about 10% and increases feed efficiency by 6%	48 hours
antibiotics	cattle and sheep	oral	increase daily rate of gain by 8% and increase feed efficiency by 4%; improve carcass quality slightly and create more fat deposition and marbling; also reduce disease level; more effective on high-roughage rations than on high-concentrate rations	48 hours
zeranol (nonestrogenic)				
Ralgro® for cattle	all cattle	implant	creates a 10% increase in daily rate of gain and a 5-10% increase in feed efficiency	none
Ralgro® for sheep	feedlot lambs	implant	creates a 12% increase in daily rate of gain and a 10% increase in feed efficiency	40 days

Growth Hormones and their Characteristics				
estrogen compounds Compudose 200 Synovex® C; CALF-oid® Synovex® S STEER-oid® Implus™-S Synovex® H HEIFER-oid® Implus™-H	 all cattle calves at least 45 days old and up to 400 lbs finishing steers over 400 lbs finishing heifers, 400 lbs or more	implants	improve daily rate of gain in the 10-15% range and increase feed efficiency 5-10%	none
TBA – trenbolone acetate for finishing steers and heifers; Finaplix® S Revelor® S Finaplix® H – administered in the last 63 days before slaughter	 finishing steers finishing heifers	implants	improve rate of gain and increase feed efficiency	none

OBJECTIVE 28

State methods other than growth stimulants that improve the rate and efficiency of gain.

Optional Activities/Resources
- Research genetic improvements that improve gain.
- Examine your current feed programs and determine how they could be adjusted to improve the quality, digestibility, and palatability.

- Feed young bulls instead of steers.

  ☞ **NOTE:** Male hormones secreted by the testicles are excellent growth stimulants.

- Take advantage of genetic improvements.
- Improve the quality of rations.

  EXAMPLES: Add BST, animal fat, fish meal

- Improve the digestibility and palatability of feed.

  EXAMPLES: Adding cooked or cracked grain, adding chemicals to break down food and make it more digestible, adding corn oil or molasses to improve flavor

- Control parasites and disease.
- Keep informed about new developments.

OBJECTIVE 29

Complete Job Sheet 8.

OBJECTIVE 30

Complete Assignment Sheet 3.

ASSIGNMENT SHEET 1

VACCINATION AND DRUGS

C-4

Name _____ Score _____

OBJECTIVE 5

Interpret information on animal health product labels.

EQUIPMENT AND SUPPLIES

- WARBEX® label at the end of this Assignment Sheet
- FEARING DECKEM™ label at the end of this Assignment Sheet
- IVOMEC® label at the end of this Assignment Sheet

INTRODUCTION

Federal agencies require that manufacturers of animal health products develop a label and have the label approved prior to marketing the product. The information written on the label has been said to be some of the most expensive words in all literature because the research, development, and registration procedures behind a label can cost the manufacturer three to five years' time and millions of dollars. The label also provides you, the user, with some very important and useful information that you must learn to read and interpret.

INSTRUCTIONS

Reading Comprehension
• Gain factual information

Part 1 Study the WARBEX® label and answer the following questions.

1. What kind of insecticide is WARBEX®?

   _____

2. What percentage is the solution? _____

3. Can WARBEX® be used with lactating cattle? _____

4. What is the withdrawal period for cattle heading for slaughter?

   _____

5. What company manufactures and sells WARBEX® and where is it located?

   _____

   _____

6. When is the best time to apply WARBEX® in Alabama?

_____

7. How many treatments should you make this spring in Oklahoma?

_____

8. How many ounces of WARBEX® should you use with a 400-pound animal?

_____

9. You put six ounces of WARBEX® into a paper cup for easy pouring and left it on a barrel while you restrained the steer. Your eight-year-old sister took a drink of it. What should you do?

_____

_____

10. What substances and how much of each should you use to clean the empty container before disposing of it and what should you do with the cleaning solution?

_____

_____

_____

11. What are the symptoms of a toxic reaction in an animal treated with WARBEX®?

_____

_____

12. What is the antidote for WARBEX®? _____

Part 2 Study the FEARING DECKEM™ insecticide ear tag label and answer the following questions.

1. What is the percentage of active ingredients in the tag? _____

2. What is the net weight per tag? _____

3. What type of storage is recommended for the tags? _____

_____

4. What type of parasites does the tag control? _____

_____

5. What is the percentage of inert ingredients? _____

6. Can the tags be used on lactating dairy cows? _____

7. What company manufactures the tags? _____

_____

8. How should the container be disposed of? _____

_____

9. What safety precautions should you take after installing the tag?

_____

_____

10. What is the withdrawal period after you tag an animal? _____

Part 3 Study the IVOMEC® label and answer the following questions.

1. Use a dictionary to define the following words used on the label:

dermatoses – _____

_____

entomology/entomologist – _____

_____

epidemiology – _____

_____

knurled – _____

_____

withers – _____

_____

2. What species of livestock is this product to be used on? Why shouldn't it be used on other species (see the warnings)?

_____

_____

_____

3. What parasites is IVOMEC® used for? _____

_____

_____

_____

4. What is the dose rate? _____

5. How much IVOMEC® would you use for a 572 lb heifer?

_____

6. How is IVOMEC® applied? _____

_____

_____

7. Ivermectin kills parasites by acting on their nervous systems. It stimulates the release of GABA to interfere with nerve impulses. For which parasites is IVOMEC® ineffective and why?

_____

_____

_____

8. What is the withdrawal period? _____

9. Can you use this product with lactating animals? _____

10. What protective clothing should you wear when using IVOMEC®?

_____

11. What precautions must be taken to avoid contaminating lakes, streams, ponds, or ground water?

_____

_____

_____

_____

12. Applying IVOMEC® to areas of the skin with mange scabs, lesions, or dermatoses can reduce it effectiveness. What are three other factors that can impair its effectiveness?

_____

_____

_____

WARNING!

HARMFUL OR FATAL IF SWALLOWED OR ABSORBED THROUGH SKIN

AVOID CONTACT WITH SKIN, EYES AND CLOTHING.

WASH THOROUGHLY AFTER HANDLING.

DO NOT CONTAMINATE FOOD OR FEED PRODUCTS.

DO NOT SLAUGHTER WITHIN 35 DAYS AFTER TREATMENT.

DO NOT TREAT LACTATING DAIRY COWS OR DRY DAIRY COWS WITHIN 21 DAYS OF FRESHENING.

FLAMMABLE

KEEP AWAY FROM HEAT, SPARKS AND OPEN FLAME INCLUDING HOT BRANDING IRON AND CAUTERY DEHORNING.

TAKE TIME

OBSERVE LABEL DIRECTIONS

WARBEX

FAMPHUR

POUR-ON FOR CATTLE

13.2%

FOR CONTROL OF CATTLE GRUBS AND REDUCTION OF LICE INFESTATIONS

Pitman-Moore

Used with permission of Mallinckrodt Veterinary, Inc. (formerly Pitman-Moore, Inc.)

PRECAUTION:

Do not use on calves less than 3 months old; animals stressed from castration, over-excitement or de- horning; sick or convalescent animals. Animals may become dehydrated and under stress following shipment. Do not treat until they are in good condition. On occasion, cattle treated with **WARBEX** may show signs of organophosphate poisoning such as excessive salivation, stiffness of limbs and bloat. Atropine is antidotal. A veterinarian should be consulted.

Brahman and Brahman crossbreds are less tolerant of cholinesterase-inhibiting insecticides than other breeds. **DO NOT TREAT BRAHMAN BULLS.**

WARNING:

WARBEX is a cholinesterase inhibitor. Do not use any drug, pesticide, insecticide or chemicals having cholinesterase-inhibiting activity either simultaneously or within a few days before or after treatment with **WARBEX**. Keep swine away from areas where run-off occurs.

DISPOSAL OF CONTAINERS:

Drain container completely. Add 1/2 gallon water, 1/4 cup of detergent and 1/4 pound of lye. Tighten closure. Rotate to wet all surfaces and let stand for at least 15 minutes. Drain completely and rinse several times with water. Bury rinse solution at least 18 inches deep in an isolated area away from water supplies. Tighten closure. Puncture and crush container to prevent reuse. Bury deeply in an isolated location with 18 inches of cover.

Toxic to fish, birds and other wildlife. Keep out of lakes, ponds and streams. Do not apply to areas where run-off occurs. Do not contaminate water by cleaning of equipment or disposal of wastes. Apply this product only as specified on this label.

DIRECTIONS FOR USE

Pour **WARBEX** at the rate of 1 ounce per 200 pounds body weight from the shoulder to the tail head. Follow the suggested schedule below:

AV. CATTLE WEIGHT	DOSAGE	ONE GALLON TREATS
200 lb .	1 oz	128 head
400 lb	2 oz	64 head
600 lb	3 oz	42 head
800 lb & over	4 oz	32 head

One treatment with **WARBEX** will effectively control cattle grubs and reduce cattle lice infestations.

FOR GRUB CONTROL:

Apply as soon as possible after heel fly activity ceases. It is important to treat before the grub larvae reach the gullet or spinal area as rapid kill of large numbers of larvae may possibly cause a host parasite reaction. As a general guide, treatment should be applied to cattle in or from the following areas as shown below:

Southwestern states —April/May
Southern states —June/July
Central states —August/September
Northern states —October/November

Consult your veterinarian, extension entomologist or county agent to confirm the best time for application in your area.

Treatment within 6-8 weeks of grub emergence will be less effective and carcass damage may result from dead grubs.

Treatment is less effective on wet animals or animals exposed to rain after treatment.

FOR LICE CONTROL:

Initial treatment (lice) must be made at the times recommended for grub control. If lice reinfestation occurs, animals may be retreated 40 days after last treatment.

IN CASE OF AN EMERGENCY ENDANGERING LIFE OR PROPERTY INVOLVING THIS PRODUCT, CALL DAY OR NIGHT, 800-541-7459

®Trademark

1381

ivomec®

(ivermectin)

pour-on for cattle

Contains 5 mg ivermectin/mL

Parasiticide

Consult your veterinarian for assistance in the diagnosis, treatment and control of parasitism.

Introduction

IVOMEC Pour-On delivers internal and external parasite control in one convenient low-volume application. Discovered and developed by scientists from Merck Sharp & Dohme Research Laboratories, IVOMEC Pour-On contains ivermectin, a unique chemical entity.

Indications

IVOMEC Pour-On applied at the recommended dose level of 500 mcg/kg is indicated for the effective control of these parasites:

Gastrointestinal Roundworms	
Ostertagia ostertagi (including inhibited stage)	(adults and L_4)
Haemonchus placei	(adults and L_4)
Trichostrongylus axei	(adults and L_4)
T. colubriformis	(adults and L_4)
Cooperia spp	(adults and L_4)
Strongyloides papillosus	(adults)
Oesophagostomum radiatum	(adults and L_4)
Trichuris spp	(adults)
Lungworms	
Dictyocaulus viviparus	(adults and L_4)
Cattle Grubs	(parasitic stages)
Hypoderma bovis	
H. lineatum	
Mites	
Sarcoptes scabiei var. *bovis*	
Lice	
Linognathus vituli	
Haematopinus eurysternus	
Damalinia bovis	
Solenopotes capillatus	
Horn Flies	
Haematobia irritans	

Treatment of Cattle for Horn Flies

IVOMEC Pour-On controls horn flies (*Haematobia irritans*) for up to 28 days after dosing. For best results IVOMEC Pour-On should be part of a parasite control program for both internal and external parasites based on the epidemiology of these parasites. Consult your veterinarian or an entomologist for the most effective timing of applications.

Dosage

The dose rate is 1 mL for each 22 lb of body weight. The formulation should be applied along the topline in a narrow strip extending from the withers to the tailhead.

Administration

Squeeze-Measure-Pour System (8.5 fl oz/250 mL and 33.8 fl oz/1 L Bottles)

Attach the metering cup to the bottle.

Set the dose by turning the top section of the cup to align the correct body weight with the pointer on the knurled cap. When body weight is between markings, use the higher setting.

Hold the bottle upright and squeeze it to deliver a slight excess of the required dose as indicated by the calibration lines.

By releasing the pressure, the dose automatically adjusts to the correct level. Tilt the bottle to deliver the dose. The off (stop) position will close the system between dosing.

Mode of Action

Ivermectin as a member of the avermectin family kills certain parasitic roundworms and ectoparasites, such as mites, lice, horn flies and other insects. Its action is unique to the avermectin class of antiparasitic agents. This action involves a chemical that serves as a signal from one nerve cell to another, or from a nerve cell to a muscle cell. This chemical, a neurotransmitter, is called gamma-aminobutyric acid or GABA.

In roundworms ivermectin stimulates the release of GABA from nerve endings and enhances binding of GABA to special receptors at nerve junctions, thus interrupting nerve impulses — thereby paralyzing and killing the parasite.

The enhancement of the GABA effect in arthropods such as mites, lice and horn flies resembles that in roundworms except that nerve impulses are interrupted between the nerve ending and the muscle cell. Again, this leads to paralysis and death.

Ivermectin has no measurable effect against flukes or tapeworms, presumably because they do not have GABA as a nerve impulse transmitter.

Recommended doses have an appropriate margin of safety in livestock. The principal peripheral neurotransmitter in mammals, acetylcholine, is unaffected by ivermectin. Ivermectin does not readily penetrate the central nervous system of mammals where GABA functions as a neurotransmitter.

Safety

Studies have demonstrated an appropriate margin of safety. Based on plasma levels, the topically applied formulation is expected to be at least as well tolerated by breeding animals as is the subcutaneous formulation which has demonstrated an adequate margin of safety in breeding animals.

WARNING: Cattle must not be treated within 48 days of slaughter for human consumption. Because a withdrawal time in milk has not been established, do not use in female dairy cattle of breeding age.

WARNING! NOT FOR USE IN HUMANS.

This product should not be applied to self or others because it may be irritating to human skin and eyes and absorbed through the skin. To minimize accidental skin contact, the user should wear a long-sleeved shirt and rubber gloves. If accidental skin contact occurs, wash immediately with soap and water. If accidental eye exposure occurs, flush eyes immediately with water and seek medical attention.

Keep this and all drugs out of the reach of children.

WARNING! FLAMMABLE!
KEEP AWAY FROM HEAT, SPARKS, OPEN FLAME AND OTHER SOURCES OF IGNITION

PRECAUTIONS

Store away from excessive heat (104°F/40°C) and protect from light.

Use only in well-ventilated areas or outdoors.

Close container tightly when not in use.

Cattle should not be treated when hair or hide is wet since reduced efficacy may be experienced.

Do not use when rain is expected to wet cattle within six hours after treatment.

This product is for application to skin surface only, do not give orally or parenterally.

Cloudiness in the formulation may occur when IVOMEC® (ivermectin) Pour-On is stored at temperatures below 32°F. Allowing to warm at room temperature will restore the normal appearance without affecting efficacy.

Antiparasitic activity of ivermectin will be impaired if the formulation is applied to areas of the skin with mange scabs or lesions, or with dermatoses or adherent materials, e.g., caked mud or manure.

Ivermectin has been associated with adverse reactions in sensitive dogs; therefore, IVOMEC Pour-On is not recommended for use in species other than cattle.

When to Treat Cattle with Grubs

IVOMEC Pour-On is effective against all stages of cattle grubs. However, proper timing of treatment is important. For the most effective results, cattle should be treated as soon as possible after the end of the heel fly (warble fly) season. While this is not peculiar to ivermectin, destruction of *Hypoderma* larvae (cattle grubs) at the period when these grubs are in vital areas may cause undesirable host-parasite reactions. Killing *Hypoderma lineatum* when it is in the esophageal tissues may cause bloat; killing *H. bovis* when it is in the vertebral canal may cause staggering or paralysis. Cattle should be treated either before or after these stages of grub development.

Cattle treated with IVOMEC Pour-On at the end of the fly season may be re-treated with IVOMEC during the winter without danger of grub-related reactions. For further information and advice on a planned parasite control program, consult your veterinarian.

Environmental Safety

Studies indicate that when ivermectin comes in contact with the soil, it readily and tightly binds to the soil and becomes inactive over time. Free ivermectin may adversely affect fish or certain water-borne organisms on which they feed. Do not permit cattle to enter lakes, streams or ponds for at least six hours after treatment. Do not contaminate water by direct application or by the improper disposal of drug containers. Dispose of containers in an approved landfill or by incineration.

Package Information

IVOMEC Pour-On is available in an 8.5 fl oz/250 mL bottle (Product 41309) and a 33.8 fl oz/1 L bottle (Product 41310), each with a squeeze-measure-pour system.

MSD AGVET

Division of MERCK & CO., Inc.
Rahway, New Jersey 07065, U.S.A.

IVOMEC REG. TM MERCK & CO., Inc.
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Rahway, New Jersey, U.S.A.
All Rights Reserved
September 1990

Used with permission of Merck AgVet Division.

For beef and lactating dairy cows

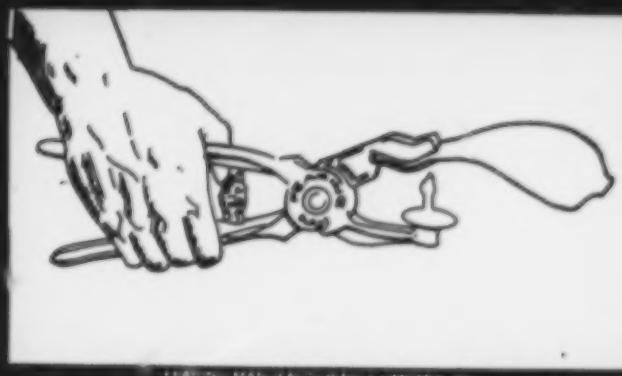
(No withdrawal period)

UP TO 5 MONTHS FLY AND TICK CONTROL

- More pounds of beef
- More pounds of milk
- Heavier calves at weaning

* Insecticide resistance may reduce effectiveness in some areas.

Safe and fast application



DECKEM INSECTICIDE EAR TAGS

For Use on Dairy and Beef Cattle and Calves to Control Horn Flies, Face Flies, Gulf Coast Ticks, Spinose Ear Ticks and as an Aid to Control Stable Flies, House Flies, and Lice on Cattle.

ACTIVE INGREDIENT	
Permethrin (3-phenoxyphenyl) methyl (±)-cis, trans-3-(2,2-dichloroethenyl)-2,2-dimethylcyclopropanecarboxylate*	10.0%
INERT INGREDIENTS	90.0%
	100.0%

*contains ratio: Min 55% (±) cis and max 45% (±) trans

KEEP OUT OF REACH OF CHILDREN
CAUTION

PRECAUTIONARY STATEMENTS
HAZARDS TO HUMANS (AND DOMESTIC ANIMALS)

CAUTION

Wash thoroughly with soap and water after handling and before eating or smoking. Avoid contamination of feed and foodstuffs.

ENVIRONMENTAL HAZARDS

This pesticide is toxic to fish. Do not add directly to water. Do not contaminate water by disposal of used tags. Use this product only as specified on this label.

CONSIDERATIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling. For control of horn flies, attach one tag to one ear of each animal in each herd. Tags remain effective up to 5 months. For control of Gulf Coast Ticks and face flies, attach two ear tags per animal (one in each ear). Apply when flies appear in economic levels. Replace as necessary. Apply with Fearing Duffex Applicator.

STORAGE AND DISPOSAL

Do not contaminate water, food or feed by storage or disposal.
STORAGE: Store in cool place away from direct sunlight.

PESTICIDE DISPOSAL: Remove tags before slaughter. Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility.

CONTAINER DISPOSAL: Dispose of empty bag in a sanitary landfill or by incineration, or, if allowed by State and local authorities, by burning. If burned, stay out of smoke.

NET WT. 9.5 GRAMS PER TAG
CONTENTS: 24 TAGS

EPA EST. 44718-MN-1
EPA REG. 44718-1

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1383

ASSIGNMENT SHEET 2

VACCINATION AND DRUGS C-4

Name _____ Score _____

OBJECTIVE 9

Calculate mixes and dosage levels for animal health products.

EQUIPMENT AND SUPPLIES

- Spotton® label at the end of this Assignment Sheet

INTRODUCTION

There is an old saying that goes, "If 3 cc are good, then 6 cc will be twice as good." Don't believe it. The manufacturer of each health care product has tested its products extensively and then printed mixing and dosage recommendations on the label. As a user, and as someone responsible for the health of your stock, you must be careful to follow those recommendations exactly in calculating mixes and dosage levels.

INSTRUCTIONS

Review the information in objectives 6 and 16, guidelines for using animal health care products and giving injections. Calculate mixes and dosage levels in Parts 1-3. Show your work in the spaces provided.

Reading Comprehension
- Gain factual information

Functional Reading
- Interpret graphics and symbols

Operation and Calculation
- Calculate with whole numbers
- Converts units of measure

Math Application
- Solve word problems

Part 1

1. Procaine is a type of penicillin administered intramuscularly. The label indicates 1 ml per 100 pounds of body weight for 2-3 days.

   You own a 600-pound sick heifer. How many ml's should you administer daily?

   _____ ml

2. You have a 340-pound calf with a respiratory infection. Your vet advises you to give it terramycin at 4 mg (milligrams) per pound of body weight. Your syringes are calibrated in milliliters. You know that 100 mg = 1 ml. What is the dosage for your calf?

   a. _____ ml

   b. How many sites will you use? _____

3. You are going to use an antibiotic that is widely administered to all species of livestock. The label indicates dosages for each species according to weight. For sheep, the recommended dosages are:

8-10 lbs	1/4 to 1/2 ml
10-20 lbs	1/2 to 1 ml
20-50 lbs	1 to 2 ml
over 50 lbs	2 to 6 ml

   You have a pair of sick lambs, one weighing 40 pounds and one weighing 21 pounds. What dosage would you give them?

   a. 40-pounder _____ ml b. 21 pounder _____ ml

   c. What is the minimum number of days you will be injecting these lambs? _____ days

Part 2

Read the case study below, and then answer the following questions. Show your calculations in the spaces provided.

The label on the PROLATE® SPRAY FOR SWINE says that to control lice and mange, mix 1 quart of insecticide with 25 gallons of water and then apply about 1 quart of diluted spray per animal. You intend to treat eight animals: three adult brood sows and five 200-pound show barrows. You do not need 25 gallons of mixture for your eight head of hogs.

☞ **NOTE:** Assume that the quart of insecticide will treat 100 animals.

Measurement review (look these up if you don't know them):

How many ounces in a quart? _____

How many quarts in a gallon? _____

How many quarts in 25 gallons? _____

If the mixture is 1 quart of insecticide to 25 gallons of water, what is the ratio of insecticide to water, in quarts?

_____

1. How much diluted spray mixture will you need for your eight animals?

   _____ qts or _____ fl oz

2. How many fluid ounces of concentrated insecticide will you need for your your eight animals?

   _____ fl oz

3. How much water will you mix with the insecticide?

   _____ fluid ounces; or _____ quarts

Part 3

Study the Spotton® cattle insecticide label, read the case study below, and then answer the questions. Show your work in the spaces provided.

You need to treat your cattle for grub control, and you have selected Spotton® for their treatment. You have 15 beef stocker steers that average 400 pounds each, a beef cow that weighs 1000 pounds, a 1500-pound bull, and a 1200-pound lactating dairy cow. Determine how much Spotton® you will need for these animals.

1. How much Spotton® will you need to treat the stocker steers?

   _____ cc

2. How much Spotton® will you need to treat the 1000-pound beef cow?

_____ cc

3. How much Spotton® will you need to treat the 1500-pound bull?

_____ cc

4. How much Spotton® will you need to treat the 1200-pound lactating dairy cow?

_____ cc

5. a. Your neighbor wants to treat 430 head of beef stocker steers and heifers weighing 600-700 pounds. What is the fewest number of one-pint and six-pint (three-quart) containers he will need?

_____

b. If a one-pint container costs $24.00, and a six-pint container costs $142.00, what is the most economical plan for treating the herd?

_____

_____

Spotton®

(fenthion)
Cattle Insecticide

20% Ready-To-Use Solution For Control of Cattle Grubs And As An Aid In Controlling Lice.

ACTIVE INGREDIENT:

fenthion (*O,O*-Dimethyl *O*-[4-methyl-thio-m-tolyl] phosphorothioate)	20.0%
INERT INGREDIENTS:	80.0%
	100.0%

WARNING
KEEP OUT OF REACH OF CHILDREN
Not for human use.
See label for warning statements.
USE ONLY AS DIRECTED.

DIRECTIONS FOR USE
Beef Cattle and Dairy Cattle Not of Breeding Age:

Spotton (fenthion) Cattle Insecticide 20% Ready-To-Use Solution requires no further dilution. A single, properly-timed application placed in one spot on the backline of an animal gives effective control of cattle grubs and will also aid in the control of lice. A second application will be required for animals heavily infested with lice or for those animals which become reinfested. A SECOND APPLICATION FOR LOUSE CONTROL SHOULD BE MADE NO SOONER THAN 35 DAYS AFTER THE FIRST TREATMENT.

AMOUNT FOR USE:

Apply Spotton 20% Ready-To-Use Solution at the rates shown in the following table. Due to the small amount of material required, care must be taken to apply the proper dose. Only one, properly-timed application per season is required for grub control.

Weight of animal	Amount of Spotton 20% Ready-To-Use Solution per animal	Number of animals per container	
		1 pint	6 pint
150-300 lbs.	4 cc	118	709
301-600 lbs.	8 cc	59	354
601-900 lbs.	12 cc	39	236
901-1200 lbs.	16 cc	29	177
Over 1200 lbs.	20 cc	24	141

APPLICATOR:

Spotton Ready-To-Use Solution can be applied using an automatic applicator gun, available from your Spotton insecticide dealer.

HOW TO APPLY:

Replace regular cap on container with the special dispenser tube cap provided. Attach the connection hose to the applicator gun and to the dispenser tube on the container. Adjust the applicator gun to the desired dose. Apply the solution to single location on the midline of the animal's back holding the applicator gun between 4 and 6 inches from the animal.

When treatment has been completed, drain any solution remaining in applicator and hose back into container. Close container tightly with original cap.

CLEANING APPLICATOR GUN:

Do not allow the Spotton Solution to remain in the connecting hose or applicator gun overnight. After each day's use, drain applicator gun and hose and then wash thoroughly by pumping 2 to 4 ounces of vegetable oil (soybean or corn cooking oil) through the system. After the oil wash, pump 2 to 4 ounces of clean water through the system. This water rinse will remove the excess oil but leave a lubrication oil film on all parts.

Wash hands thoroughly with soap and warm water after cleaning applicator.

WHEN TO TREAT FOR GRUB CONTROL:

Proper timing of treatment is important. For most effective results, cattle should be treated as soon as possible after heelfly activity ceases. Host-parasite reactions such as bloat, salivation, staggering and paralysis, may sometimes occur when cattle are treated while the common cattle grub *(Hypoderma lineatum)* is in the gullet, or while the northern cattle grub *(H. bovis)* is in the area of the spinal cord. Cattle should be treated before these stages of grub development. Consult your veterinarian, extension livestock specialist, or extension entomologist regarding the timing of treatment.

NOTE: If it is impossible to determine the origin of the cattle, and thus the exact stage of the grubs is unknown, it is recommended that the cattle receive only a maintenance ration of low energy feed during the treatment period. This lessens the likelihood of severe bloat which may occur in cattle on full feed when the common grub is killed while in the gullet.

WHEN TO TREAT FOR LICE CONTROL:
For Cattle NOT Previously Treated for Grubs-

Follow recommendations under **WHEN TO TREAT FOR GRUB CONTROL** to avoid host-parasite reactions.

For Cattle Previously Treated for Grubs-

Cattle which have been previously treated for grub control with a systemic insecticide may again be treated later in the season should lice become a problem. The second treatment should not be applied sooner than 35 days after the first treatment.

CAUTION:

Do not treat calves less than 3 months old, sick, convalescent, or severely stressed livestock. This product is intended for use on beef cattle and non-lactating dairy cattle only. Apply this product only as specified on this label. Do not treat cattle for 10 days before or after shipping, weaning, or dehorning, or after exposure to contagious infectious diseases.

WARNING:

DO NOT SLAUGHTER WITHIN 45 DAYS OF TREATMENT. DO NOT TREAT DAIRY CATTLE OF BREEDING AGE. A WITHDRAWAL PERIOD HAS NOT BEEN ESTABLISHED FOR THIS PRODUCT IN PRE-RUMINATING CALVES. DO NOT USE IN CALVES TO BE PROCESSED FOR VEAL.

Notice to Veterinarian: If the proper dosage of Spotton 20% Ready-To-Use Solution has been applied and adverse reactions, such as bloat, excessive salivation, and posterior paralysis occur, it is highly probable that a host-parasite reaction exists. Administer symptomatic treatment. Anti-inflammatory agents may be helpful. If necessary relieve bloat by trocarization, as a stomach tube may traumatize a severely swollen esophagus. Do not administer atropine, as it is contraindicated in host-parasite reactions. If toxicity should occur as a result of gross overdosage, atropine is antidotal.

WARNING:

Spotton (fenthion) 20% Ready-To-Use Solution is a cholinesterase inhibitor. Do not use this product on animals simultaneously with or within a few days before or after treatment with or exposure to cholinesterase-inhibiting drugs, pesticides or chemicals.

NOTE: Acute symptoms of overdosage in cattle are frequent defecation, urination, lacrimation and muscular twitching. Later symptoms are salivation, diarrhea and muscular weakness.

WARNING:

May be fatal if swallowed, inhaled or absorbed through the skin. Do not get in eyes, on skin or on clothing. Wash thoroughly with soap and warm water after handling. Wash contaminated clothing with soap and hot water before re-use. Do not contaminate feed or food. Keep out of reach of children. This material contains a cholinesterase inhibitor. If swallowed by a human, IMMEDIATELY call a physician, poison control center or hospital emergency room. Upon medical advice induce vomiting with ipecac syrup. If ipecac is not available, have person drink a glass of water or milk, then gently induce vomiting by tickling back of throat with finger or blunt object—be extremely careful not to damage the throat.

To Physician- Atropine is antidotal. 2-PAM is also antidotal, but must be administered in conjunction with atropine.

CONTAINER DISPOSAL:

Do not re-use empty container. Destroy it by burying with wastes or burning. Stay away from smoke or fumes. Do not use container in any connection with feed, food or drinking water.

PROTECT WILDLIFE:

This product is toxic to fish, birds and other wildlife. Keep out of lakes, streams or ponds. Do not contaminate water by cleaning of equipment or disposal of wastes. Do not apply where runoff is likely to occur. Apply this product only as specified on the label.

Supplied

Code:	13662	1 pint
	13660	6 pints

Used with permission of Miles Animal Health.

ASSIGNMENT SHEET 3	*VACCINATION AND DRUGS*	**C-4**

Name _____ Score _____

OBJECTIVE 30

Report on new technology and developments in vaccination and drugs.

INSTRUCTIONS

Reading Comprehension
- Gain factual information

Research and Reference
- Use magazines and newspapers

Life Science
- Investigate health issues

Oral Presentation
- Make informative presentations
- Use good speaking techniques
- Select/use words effectively
- Use effective body language
- Present appropriate appearance
- Integrate audio and/or visual materials into oral presentations

Use livestock production or other agricultural magazines, newspapers, and similar publications to find new products, new equipment, or new techniques related to vaccination and drugs.

If you find a new product advertised, write or call the company requesting more information. Discuss the product with a veterinarian or with your local supplier. If you find out about new technology, equipment, or techniques, read at least one article on it. You can look it up in *Reader's Guide to Periodic Literature* or another source and learn more about it to report to the class.

Make an oral presentation to the class about your research.

Your report should:

- Identify the subject.
- Identify the source – manufacturer, researchers, university or laboratory where the product was developed.
- Describe its use or application.
- Discuss the advantages and disadvantages if appropriate
- Tell where and how other people can obtain it.
- Use a picture if you have one available.

☞ **NOTE:** Be sure to hold it up so that everyone can see it and hold it up long enough so everyone has time to look at it. Don't pass it around during your presentation.

JOB SHEET 1	*VACCINATION AND DRUGS*	**C-4**

Name _____

OBJECTIVE 12

Drench an animal.

EQUIPMENT AND SUPPLIES

- Drenching gun
- Drench and manufacturer's instructions
- 3-gallon pail
- Liquid disinfectant and water
- Sheep
- Plastic or rubber gloves

PROCEDURE

Functional Reading
- Follow written instructions
- Interpret graphics and symbols

Life Science
- Investigate health issues

Cognitive Activities
- Transfer knowledge/training to new situations

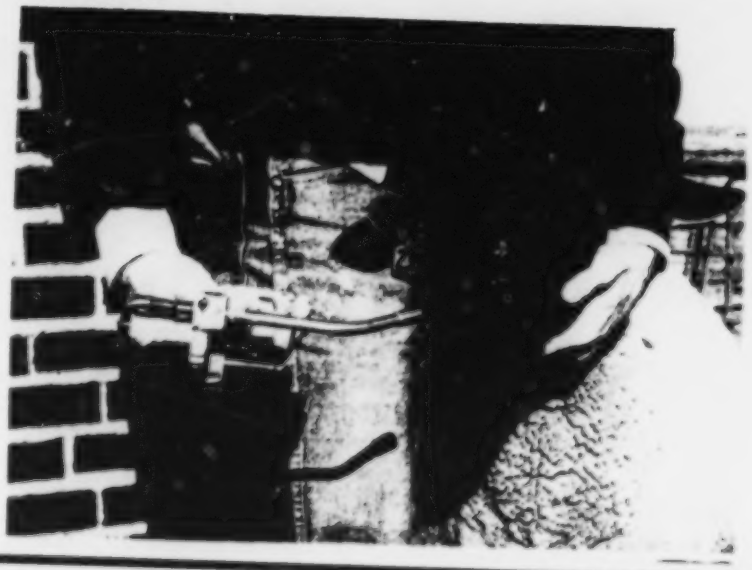
Job Acquisition/ Development
- Master specific job task/procedure
- Practice good work habits/attitudes

	Yes	No
1. Read the manufacturer's recommendations and determine the proper dosage level for the sheep you are treating.	____	____
2. Mix enough disinfectant in the pail to immerse the drenching gun.	____	____
3. Place the gun in the disinfectant.	____	____
4. Restrain the sheep.	____	____
5. Put on your gloves.	____	____

6. Put one hand under the sheep's jaw and lift its head. (Figure 1)

Yes ____ No ____

FIGURE 1



CAUTION: POSITION THE GUN CAREFULLY. Too much force or incorrect placement can injure the animal's mouth and throat.

7. Hold the drenching gun in the other hand and place the nozzle to the side of the animal's mouth, over the tongue, and in the back part of the throat. (Figure 2)

____ ____

FIGURE 2

CAUTION: DEPOSIT THE DRENCH SLOWLY. Depositing the drench too fast can cause the animal to breathe the fluid into its lungs.

	Yes	No
8. Push the release trigger on the gun to deposit the drench at a moderate rate so that the animal has time to swallow it.	____	____
9. Have your instructor check your work.	____	____
10. Release the animal.	____	____
11. Clean the work area and store your equipment and materials properly.	____	____

SKILL TEST RECORD

EVALUATOR'S COMMENTS

_____

_____

_____

PRODUCT EVALUATION

Evaluator note: Rate the student on the following criteria by circling the appropriate numbers. Each criterion must receive a rating of "3" or higher to demonstrate student mastery. (See Key below.) A student who is unable to demonstrate mastery should review the material and submit another product for evaluation.

Criteria:

Observed safety procedures	4	3	2	1
Successfully administered drench	4	3	2	1
Handled the animal properly	4	3	2	1

AVERAGE RATING

Evaluator note: To obtain an average rating for the Competency Profile, total the points in Product Evaluation and divide by the total number of criteria. Circle the rating on the Key.

KEY

4 **Skilled** – Can perform job with no additional training.
3 **Moderately Skilled** – Has performed job during training program; limited additional training may be required.
2 **Limited Skill** – Has performed job during training program; additional training is required to develop skill.
1 **Unskilled** – Is familiar with process, but is unable to perform job.

EVALUATOR'S COMMENTS

_____

_____

_____

JOB SHEET 2	*VACCINATION AND DRUGS*	**C-4**

Name _____

OBJECTIVE 13

Administer paste.

EQUIPMENT AND SUPPLIES

- Cattle-working chute
- Applicator gun
- Paste wormer
- Manufacturer's instructions
- Cattle
- Plastic or rubber gloves

PROCEDURE

Functional Reading
- Follow written instructions
- Interpret graphics and symbols

Life Science
- Investigate health issues

Cognitive Activities
- Transfer knowledge/training to new situations

Job Acquisition/ Development
- Master specific job task/procedure
- Practice good work habits/attitudes

	Yes	No
☛ **NOTE:** Estimate the animal's weight or weigh the animal before administering the paste.		
1. Read the manufacturer's recommendations and determine the proper dosage level for the weight of the cattle you are worming.	____	____
2. Load the applicator gun with the proper dosage.	____	____
3. Restrain the animal in the chute so that it will not be able to escape or injure itself or you.	____	____
4. Put on your gloves.	____	____
5. Standing close to one side of the animal's head, reach over top of the head and place your hand under front part of the jaw. (See Figure 1)	____	____

FIGURE 1

CAUTION: AVOID DAMAGING THE ANIMAL'S TEETH AND LINING OF THE MOUTH. Injury can occur if you are too forceful or place the gun improperly.

	Yes	No
6. Holding the loaded applicator gun in your other hand, place the nozzle of the tube into the animal's mouth so that it is well back into the mouth and on the center of the tongue (Figure 2).	____	____

FIGURE 2

	Yes	No
7. Squeeze the trigger the correct number of clicks to deposit the correct dosage of paste.	____	____
8. Remove the applicator gun from the animal's mouth, and watch to see that the animal swallows the paste.	____	____
9. Have your instructor check your work.	____	____
10. Move away from the animal and release it from the chute.	____	____
11. Clean the work area and store your equipment and materials properly.	____	____

SKILL TEST RECORD

EVALUATOR'S COMMENTS

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PRODUCT EVALUATION

Evaluator note: Rate the student on the following criteria by circling the appropriate numbers. Each criterion must receive a rating of "3" or higher to demonstrate student mastery. (See Key below.) A student who is unable to demonstrate mastery should review the material and submit another product for evaluation.

Criteria:

Observed safety procedures	4	3	2	1
Successfully administered paste	4	3	2	1
Handled the animal properly	4	3	2	1

AVERAGE RATING

Evaluator note: To obtain an average rating for the Competency Profile, total the points in Product Evaluation and divide by the total number of criteria. Circle the rating on the Key.

KEY

4 **Skilled** – Can perform job with no additional training.
3 **Moderately Skilled** – Has performed job during training program; limited additional training may be required.
2 **Limited Skill** – Has performed job during training program; additional training is required to develop skill.
1 **Unskilled** – Is familiar with process, but is unable to perform job.

EVALUATOR'S COMMENTS

_____

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JOB SHEET 3

VACCINATION AND DRUGS

C-4

Name _____

OBJECTIVE 14

Administer a bolus.

EQUIPMENT AND SUPPLIES

- Cattle-working chute
- Balling gun
- Bolus and manufacturer's instructions
- 3-gallon pail
- Water
- Disinfectant
- Cattle
- Plastic or rubber gloves

PROCEDURE

Functional Reading
- Follow written instructions
- Interpret graphics and symbols

Life Science
- Investigate health issues

Cognitive Activities
- Transfer knowledge/training to new situations

Job Acquisition/ Development
- Master specific job task/procedure
- Practice good work habits/attitudes

	Yes	No
1. Read the manufacturer's instructions for the proper dosage level for the animal being treated.	____	____
2. Mix enough disinfectant solution to immerse the balling gun.	____	____
3. Dip the gun in the container of disinfectant.	____	____
4. Restrain the animal in the chute so that it won't be able to jump.	____	____
5. Put on your gloves.	____	____
6. Place the bolus in the balling gun. (See Figure 1)	____	____

FIGURE 1

	Yes	No
7. Standing close to one side of the animal's head, reach over the top of the head and place your hand beneath the animal's mouth to lift its head. (Figure 2)	____	____

FIGURE 2

CAUTION: AVOID DAMAGING THE ANIMAL'S TEETH AND LINING OF THE MOUTH. Injury can occur if you are too forceful or place the gun improperly.

	Yes	No
8. Holding the balling gun in your other hand, place the gun in the side of the animal's mouth, over the top of the tongue, and to the back of the throat. (Figure 3)	____	____

FIGURE 3

9. Push the trigger mechanism to release the bolus.	____	____
10. Remove the gun from the animal's mouth, and watch to see that it swallows the bolus.	____	____
11. Have your instructor check your work.	____	____
12. Move away from the animal and then release it from the chute.	____	____
13. Clean the work area and store your equipment and materials properly.	____	____

SKILL TEST RECORD

EVALUATOR'S COMMENTS

_____

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PRODUCT EVALUATION

Evaluator note: Rate the student on the following criteria by circling the appropriate numbers. Each criterion must receive a rating of "3" or higher to demonstrate student mastery. (See Key below.) A student who is unable to demonstrate mastery should review the material and submit another product for evaluation.

Criteria:

Observed safety procedures	4	3	2	1
Successfully administered bolus	4	3	2	1
Handled the animal properly	4	3	2	1

AVERAGE RATING

Evaluator note: To obtain an average rating for the Competency Profile, total the points in Product Evaluation and divide by the total number of criteria. Circle the rating on the Key.

KEY

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2 **Limited Skill** – Has performed job during training program; additional training is required to develop skill.
1 **Unskilled** – Is familiar with process, but is unable to perform job.

EVALUATOR'S COMMENTS

_____

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JOB SHEET 4

VACCINATION AND DRUGS

C-4

Name _____

OBJECTIVE 15

Install an insecticide ear tag.

EQUIPMENT AND SUPPLIES

- Cattle-working chute
- Tag applicator
- Ear tag and manufacturer's recommendations
- 3-gallon pail
- Water
- Disinfectant
- Rubber or plastic gloves
- Cattle

☞ **NOTE:** Most manufacturers recommend that cattle weigh over 500 pounds before ear tags are used.

PROCEDURE

Functional Reading
- Follow written instructions
- Interpret graphics and symbols

	Yes	No
1. Read the manufacturer's instructions.	____	____
2. Put on your gloves.	____	____
3. Mix enough disinfectant to immerse the applicator and tag.	____	____
4. Dip the applicator and tag in the disinfectant.	____	____

⚠ **CAUTION:** HEAD MOVEMENT CAN SPLIT THE EAR WHEN THE TAG IS INSTALLED. Be sure the animal can't move its head.

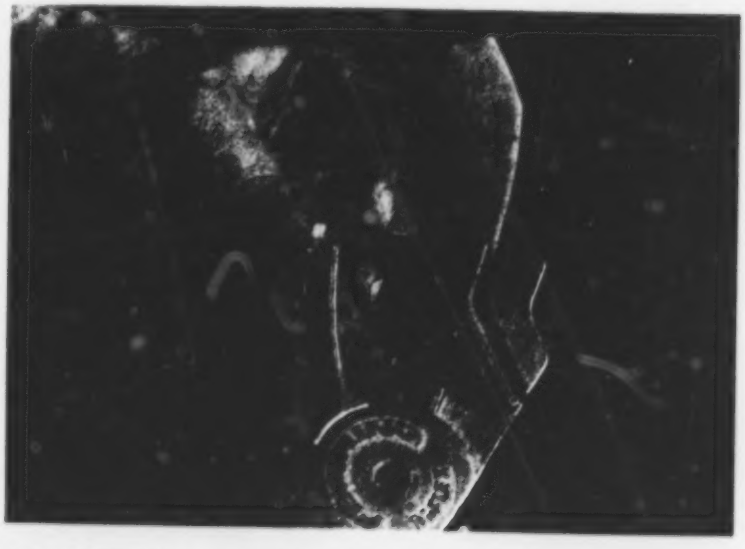
5. Restrain the animal in the chute so it won't be able to move its head.	____	____
6. Remove the applicator and tag from the disinfectant.	____	____

	Yes	No
7. Hold the tag with the collar pointing down. (See Figure 1)	____	____
8. Depress the lever and place the female part of the tag under the applicator clip. (Figure 1)	____	____

FIGURE 1

9. Slide the male button of tag on the pin until it projects through the tip of applicator. (Figure 2) ____ ____

FIGURE 2



CAUTION: DAMAGE TO THE EAR CAN OCCUR. Do not let the shaft of the male button penetrate cartilage rib or a blood vessel.

	Yes	No
10. Position the tag on the flat surface in the center of the ear where the shaft of the male button will not penetrate any cartilage rib or blood vessel. (Figure 3)	____	____

FIGURE 3

11. With a firm grip on the applicator handle, connect the tag to the ear by squeezing the handle.	____	____
12. Check the tag to see that the proper connection has been made and that the tag hangs properly. (Figure 4)	____	____

FIGURE 4

	Yes	No
13. Have your instructor check your work.	____	____
14. Move away from the animal and release it from the chute.	____	____
15. Clean the work area and store equipment and materials properly.	____	____

SKILL TEST RECORD

EVALUATOR'S COMMENTS

_____

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PRODUCT EVALUATION

Evaluator note: Rate the student on the following criteria by circling the appropriate numbers. Each criterion must receive a rating of "3" or higher to demonstrate student mastery. (See Key below.) A student who is unable to demonstrate mastery should review the material and submit another product for evaluation.

Criteria:				
Observed safety procedures	4	3	2	1
Successfully tagged the animal	4	3	2	1
Handled the animal properly	4	3	2	1

AVERAGE RATING

Evaluator note: To obtain an average rating for the Competency Profile, total the points in Product Evaluation and divide by the total number of criteria. Circle the rating on the Key.

KEY

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3 **Moderately Skilled** – Has performed job during training program; limited additional training may be required.
2 **Limited Skill** – Has performed job during training program; additional training is required to develop skill.
1 **Unskilled** – Is familiar with process, but is unable to perform job.

EVALUATOR'S COMMENTS

_____

_____

_____

JOB SHEET 5

VACCINATION AND DRUGS

C-4

Name _____

OBJECTIVE 21

Fill a syringe.

EQUIPMENT AND SUPPLIES

- Sterile, large-diameter needle

  ☞ **NOTE:** Many drugs thicken when refrigerated and a large-diameter needle is helpful for filling the syringe with the thickened drug.

- Clean, sterile syringe
- Antiseptic and cotton ball or swab with which to apply it
- Medicine vial
- Dosage level assigned by your instructor

PROCEDURE

Functional Reading
- Follow written instructions
- Interpret graphics and symbols

Job Acquisition/ Development
- Master specific job task/procedure
- Practice good work habits/attitudes

	Yes	No
1. Insert the tip of the syringe into needle hub and twist it clockwise to ensure a snug fit.	____	____
2. Clean the rubber stopper of the medicine vial with antiseptic and cotton. (Figure 1)	____	____

FIGURE 1

	Yes	No
3. Pull back on the plunger to fill the syringe with the amount of air equal to the desired dosage. (Figure 2)	____	____

FIGURE 2

4. Pass the needle through the rubber stopper of the medicine vial and slowly inject the air into the bottle.	____	____
5. Invert the vial and withdraw the dosage, making sure that the needle is in the solution. (Figure 3)	____	____

FIGURE 3

	Yes	No
6. Pull the needle straight out through the stopper.	___	___
7. Remove air bubbles from the syringe:		
a. Hold it upright and tap on it gently with your finger. (Figure 4)	___	___
b. Push the plunger upward to expel a drop or two of medication.	___	___

FIGURE 4

8. Hold the syringe and plunger so that you will not spill the medication or contaminate the needle.	___	___

☑ **NOTE:** When the syringe is filled, you are ready to inject the animal.

⚠ **IMPORTANT:** AVOID CONTAMINATION. The syringe and needle should be used now and should never be laid down or set aside because of possible contamination.

9. Have your instructor check your work.	___	___

	Yes	No
10. Clean the work area and store equipment and materials properly.	____	____

SKILL TEST RECORD

EVALUATOR'S COMMENTS

_____

_____

_____

PRODUCT EVALUATION

Evaluator note: Rate the student on the following criteria by circling the appropriate numbers. Each criterion must receive a rating of "3" or higher to demonstrate student mastery. (See Key below.) A student who is unable to demonstrate mastery should review the material and submit another product for evaluation.

Criteria:

Used sterile equipment	4	3	2	1
Filled the syringe with the proper dosage	4	3	2	1
Handled the syringe to avoid contamination	4	3	2	1

AVERAGE RATING

Evaluator note: To obtain an average rating for the Competency Profile, total the points in Product Evaluation and divide by the total number of criteria. Circle the rating on the Key.

KEY

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3 **Moderately Skilled** – Has performed job during training program; limited additional training may be required.
2 **Limited Skill** – Has performed job during training program; additional training is required to develop skill.
1 **Unskilled** – Is familiar with process, but is unable to perform job.

EVALUATOR'S COMMENTS

JOB SHEET 6

VACCINATION AND DRUGS

C-4

Name _____

OBJECTIVE 22

Give an intramuscular injection.

EQUIPMENT AND SUPPLIES

- Sterile syringe with 16-gauge, 1-inch needle
- Weaning pig
- Antibiotic
- Means of restraint
- Plastic or rubber gloves
- Antiseptic and sterile cotton balls or 4 x 4 gauze pad with which to apply it

PROCEDURE

Functional Reading
- Follow written instructions
- Interpret graphics and symbols

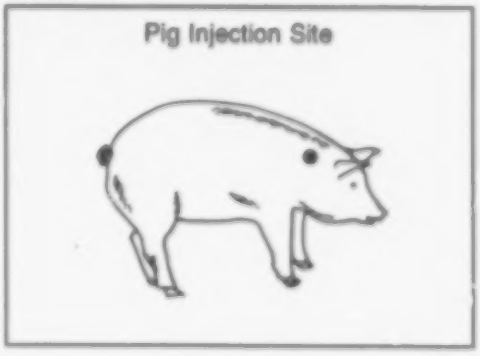
Life Science
- Investigate health issues

Cognitive Activities
- Transfer knowledge/training to new situations

Job Acquisition/ Development
- Master specific job task/procedure
- Practice good work habits/attitudes

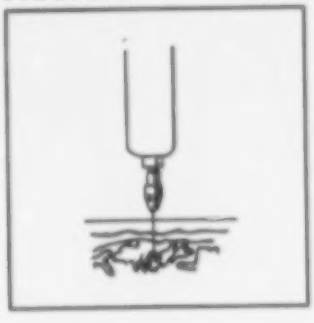
	Yes	No
1. Read all directions and cautions on the antibiotic label.	____	____
2. Restrain the animal.	____	____
3. Put on your gloves.	____	____
4. Attach the needle to the syringe if needed.	____	____
5. Clean the injection site with antiseptic. (Figure 1)	____	____

FIGURE 1



	Yes	No
6. Draw the recommended amount of antibiotic into the syringe.	____	____
7. Insert the needle its full length into the injection site, and discharge the dosage. (Figure 2)	____	____

FIGURE 2



8. Withdraw the needle and massage the injection site to distribute the antibiotic.	____	____
9. Have your instructor check your work.	____	____
10. Release the animal.	____	____
11. Sterilize the syringe and needle.	____	____
12. Store your equipment and materials properly.	____	____

SKILL TEST RECORD

EVALUATOR'S COMMENTS

_____

_____

_____

PRODUCT EVALUATION

Evaluator note: Rate the student on the following criteria by circling the appropriate numbers. Each criterion must receive a rating of "3" or higher to demonstrate student mastery. (See Key below.) A student who is unable to demonstrate mastery should review the material and submit another product for evaluation.

Criteria:

Observed safety procedures	4	3	2	1
Handled the syringe properly to avoid contamination	4	3	2	1
Handled the animal properly	4	3	2	1

AVERAGE RATING

Evaluator note: To obtain an average rating for the Competency Profile, total the points in Product Evaluation and divide by the total number of criteria. Circle the rating on the Key.

KEY

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3 **Moderately Skilled** – Has performed job during training program; limited additional training may be required.
2 **Limited Skill** – Has performed job during training program; additional training is required to develop skill.
1 **Unskilled** – Is familiar with process, but is unable to perform job.

EVALUATOR'S COMMENTS

JOB SHEET 7

VACCINATION AND DRUGS

C-4

Name _____

OBJECTIVE 23

Give a subcutaneous injection.

EQUIPMENT AND SUPPLIES

- Sterile syringe with 16-gauge, 3/4-inch needle
- Calf
- Wormer or vaccine
- Means of restraint
- Plastic or rubber gloves
- Antiseptic and sterile cotton balls or 4 x 4 gauze pad with which to apply it

PROCEDURE

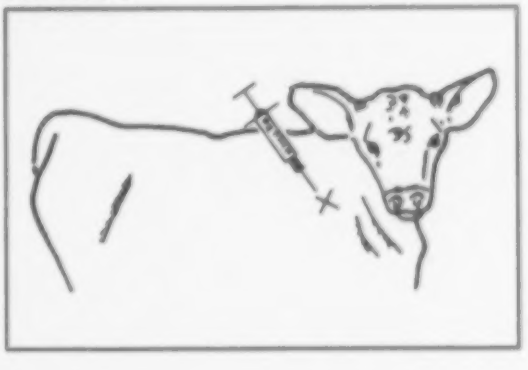
Functional Reading
- Follow written instructions
- Interpret graphics and symbols

Life Science
- Investigate health issues
- Investigate/apply principles of anatomy/physiology

Cognitive Activities
- Transfer knowledge/training to new situations

	Yes	No
1. Read all directions and cautions on the medication label.	____	____
2. Restrain the animal.	____	____
3. Attach the needle to the syringe if needed.	____	____
4. Put on your gloves.	____	____
5. Clean the injection site with the antiseptic. (Figure 1)	____	____

FIGURE 1



Job Acquisition/ Development
- Master specific job task/procedure
- Practice good work habits/attitudes

	Yes	No
6. Draw the recommended amount of vaccine into the syringe.	____	____
7. Pick up the animal's skin at the injection site and insert the needle *between* the skin and the muscle.	____	____

IMPORTANT: MAKE SURE THAT THE DOSAGE IS DEPOSITED BETWEEN THE SKIN AND THE MUSCLE. If not, the medication will form a knot at the injection site and will not be absorbed.

8. Discharge the dosage. (Figure 2)	____	____

FIGURE 2

9. Withdraw the needle and massage the injection site to distribute the vaccine.	____	____
10. Have your instructor check your work.	____	____
11. Release the animal.	____	____
12. Sterilize the syringe and needle, and store your equipment and materials properly.	____	____

SKILL TEST RECORD

EVALUATOR'S COMMENTS

_____

_____

_____

PRODUCT EVALUATION

Evaluator note: Rate the student on the following criteria by circling the appropriate numbers. Each criterion must receive a rating of "3" or higher to demonstrate student mastery. (See Key below.) A student who is unable to demonstrate mastery should review the material and submit another product for evaluation.

Criteria:

Observed safety precautions	4	3	2	1
Successfully performed a subcutaneous injection	4	3	2	1
Handled the animal properly	4	3	2	1

AVERAGE RATING

Evaluator note: To obtain an average rating for the Competency Profile, total the points in Product Evaluation and divide by the total number of criteria. Circle the rating on the Key.

KEY

4 **Skilled** – Can perform job with no additional training.
3 **Moderately Skilled** – Has performed job during training program; limited additional training may be required.
2 **Limited Skill** – Has performed job during training program; additional training is required to develop skill.
1 **Unskilled** – Is familiar with process, but is unable to perform job.

EVALUATOR'S COMMENTS

_____

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_____

JOB SHEET 8	*VACCINATION AND DRUGS*	**C-4**

Name _____

OBJECTIVE 29

Implant cattle and sheep.

EQUIPMENT AND SUPPLIES

- Implant gun and needle
- Implant pellets
- Calves and lambs
- Means of restraint
- Antiseptic and sterile cotton balls or 4 x 4 gauze pad with which to apply it
- Pipe cleaner

Avoid the following common implant errors:

- gouging the cartilage of the ear
- implanting between layers of skin or into the muscle rather than between skin and muscle
- piercing an ear vein and causing minor hemorrhage

PROCEDURE

Functional Reading
- Follow written instructions
- Interpret graphics and symbols

Life Science
- Investigate health issues

Cognitive Activities
- Transfer knowledge/training to new situations

	Yes	No
1. Read all the directions and cautions on the implant pellet label.	____	____

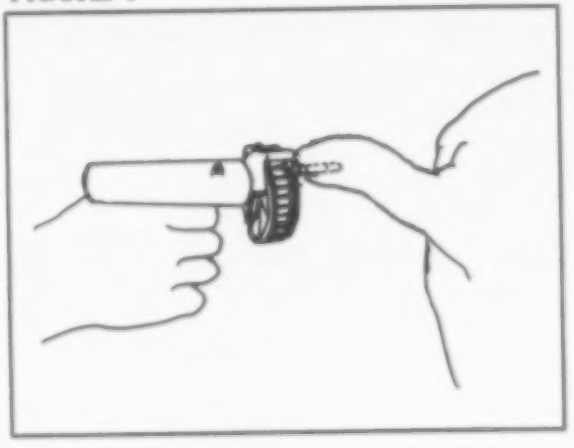
☛ **NOTE:** Proper dosage is important. *Do not* take the attitude, "If a little is good, a lot is better."

2. Restrain the animal.	____	____

CAUTION: MAKE SURE THAT THE CARTRIDGE IS INSERTED PROPERLY. If pellets are forced out of the wrong side of the cartridge, they will be crushed. Crushed pellets are absorbed too rapidly, which may cause side effects and reduce the growth response.

	Yes	No
3. Place the implant cartridge into the implant gun according to the manufacturer's instructions.	___	___
4. Choose a sharp needle and insert it into the implant gun.	___	___
5. Determine which ear is to be implanted, and adjust the needle and cartridge so that the needle can be positioned next to and parallel to the ear, with the slant side of the needle facing outward. (Figure 1)	___	___

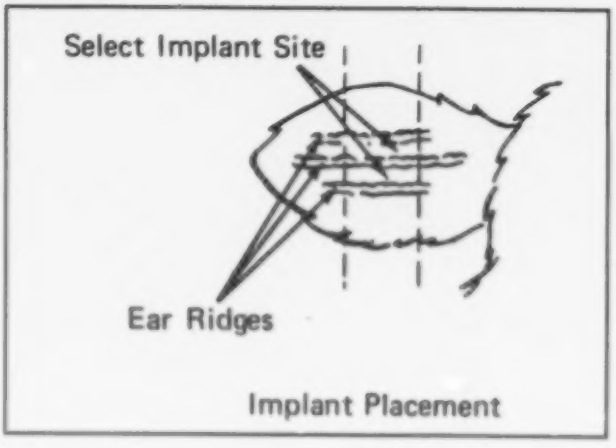
FIGURE 1



☑ **NOTE:** To avoid confusion, implant all animals in the same ear. When the animals are reimplanted, use the opposite ear. Be sure to enter in your records the implant procedure and the ear used.

6. Locate the implant site on the back, middle third of the ear, at least 2" from the base of the ear, between the ridges of cartilage. (See Figure 2)	___	___

FIGURE 2



	Yes	No
7. Clean the needle and the implant site with antiseptic to reduce contamination.	____	____

CAUTION: BE SURE TO USE PROPER RESTRAINT. When the ear is grasped and the needle inserted, the animal may throw its head and injure you or itself. If help is available, use an assistant for backup.

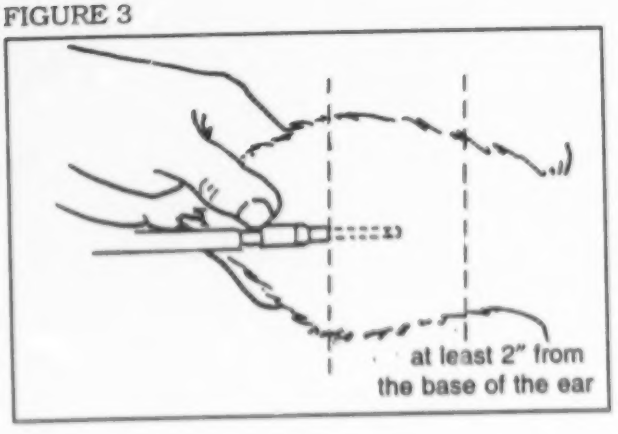
8. Grasp and manipulate the ear with one hand while using your other hand to position the implant gun parallel to and nearly flush with the ear; make sure that the tip of the needle faces the base of the ear and that the beveled part of the needle faces up. (See Figure 3) ____ ____

9. Pick up the skin at the implant site with the tip of the needle or with your fingers. ____ ____

10. Keeping the needle parallel to the ear, insert it under the skin for its full length. (See Figure 3) ____ ____

☞ **NOTE:** If you are not sure of the position of the needle tip, feel the point beneath the skin.

FIGURE 3



	Yes	No
11. Pull the implant gun and needle back about 3/8 of an inch to create a space for the implant pellets so they will not be crushed.	____	____
12. Squeeze the trigger gently and insert the prescribed number of pellets according to the label directions.	____	____
13. Keep the trigger depressed and gently withdraw the needle.	____	____
14. Feel the ear for the implants. If you can't feel them, examine the ear closely to determine whether the pellets were inserted properly; reimplant only if the pellets are not in the ear.	____	____
15. Have your instructor check your work.	____	____
16. Release the animal.	____	____
17. Clean the implant gun and disinfect the needle with antiseptic. If the inside of the needle is filled with blood or crushed implant, clean it with a pipe cleaner.	____	____

☛ **NOTE:** Heavy hair and thick skin will dull needles. Also, bumping the needle on the headgate or other object can cause a burr on the tip. A burr can be removed with a whetstone.

	Yes	No
18. Store your equipment and materials properly.	____	____

SKILL TEST RECORD

EVALUATOR'S COMMENTS

_____

_____

_____

PRODUCT EVALUATION

Evaluator note: Rate the student on the following criteria by circling the appropriate numbers. Each criterion must receive a rating of "3" or higher to demonstrate student mastery. (See Key below.) A student who is unable to demonstrate mastery should review the material and submit another product for evaluation.

Criteria:

Observed safety precautions	4	3	2	1
Successfully implanted pellets	4	3	2	1
Handled the animal properly	4	3	2	1

AVERAGE RATING

Evaluator note: To obtain an average rating for the Competency Profile, total the points in Product Evaluation and divide by the total number of criteria. Circle the rating on the Key.

KEY

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3 **Moderately Skilled** – Has performed job during training program; limited additional training may be required.
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1 **Unskilled** – Is familiar with process, but is unable to perform job.

EVALUATOR'S COMMENTS

OBJECTIVE SHEET

DEHORNING, DOCKING, AND CASTRATION

C-5

INTRODUCTION

Livestock production requires a sound program for maintaining the health, safety, and profitability of your stock. Dehorning, docking, and castration are important procedures for achieving these goals. Cleanliness, confidence, and proper use of the right tools are critical to a successful operation.

PREREQUISITES

Unit B-2 "Reproductive Organs"
Unit C-1 "Animal Health Care"
Unit C-4 "Vaccination and Drugs"

FOCUS ASSIGNMENTS

Reading Comprehension
- Gain factual information
- Analyze cause and effect
- Draw conclusions

Language
- Use standard grammar, spelling, and capitalization
- State ideas clearly

Composition
- Use complete sentences

FOCUS ASSIGNMENTS	
PREREADING:	Read the Handout on castration.
WRITING:	Write a short essay (one paragraph to one page) summarizing the main ideas in the Handout.

UNIT OBJECTIVE

After completing this unit, you will show the following competencies by mastering the activities on the Job Sheets and by scoring at least 85% on the Written Test.

SPECIFIC OBJECTIVES

1. Choose the word or phrase to complete statements about dehorning.
2. State precautions for dehorning.

3. Identify types of dehorners.

4. Match mechanical dehorning tools to their descriptions.

5. List factors that determine the appropriate method of dehorning.

6. Select from a list ways to stop bleeding after dehorning.

7. Dehorn cattle using the Keystone or Barnes dehorner. (Job Sheet 1)

8. Dehorn cattle with a hot iron. (Job Sheet 2)

9. Choose the word or phrase to complete statements about docking.

10. State precautions for docking.

11. Identify tools used in docking.

12. Match docking tools to their descriptions.

13. Dock lambs using the elastrator. (Job Sheet 3)

14. Dock lambs using the Burdizzo. (Job Sheet 4)

15. Choose the word or phrase to complete statements about castration.

16. State precautions and safety factors for castration.

17. Identify castration tools.

18. Choose the word or phrase to complete statements about castration methods.

19. State proper times and methods of castration for cattle, swine, and sheep.

20. Castrate cattle using the knife method. (Job Sheet 5)

21. Castrate swine using the knife method. (Job Sheet 6)

22. Castrate sheep using the elastrator method. (Job Sheet 7)

23. Discuss poultry debeaking, caponizing, wing treatments, and other production practices.

INFORMATION SHEET

DEHORNING, DOCKING, AND CASTRATION

C-5

OBJECTIVE 1

Choose the word or phrase to complete statements about dehorning.

Required Activities/Resources
- Discuss the importance of choosing the proper time and the proper method for dehorning.

Optional Activities/Resources
- Video

☞ **NOTE:** Review methods of animal restraint from Unit C-1, "Animal Health Care."

(?) A Texas A&M genetic researcher has isolated a gene for polled characteristics in cattle. The gene can be injected into the embryo of any breed to produce animals born without horns. Begin your discussion with the question, "What would be the advantages and disadvantages of genetically polled cattle?"

WORDS YOU SHOULD KNOW	
button	cartilage that grows into horn tissue
caustic	capable of destroying or eating away by chemical action
dehorn	to remove horns from livestock
tipping	cutting off the point of the horn

- **Advantages of dehorning**
  - Cattle (and goats) with horns can damage property and can injure humans and other cattle, sometimes causing death.
  - Bruises from horns lower the value of meat and hides.
  - Dehorned animals require less space in feedlots and trucks.
  - Feeder cattle have more rapid weight gain because they are less inclined to fight around the feed bunk after dehorning.

- Some breeders raise polled, or hornless stock, to control injuries, others use dehorning. Breeders of valuable purebred stock may not dehorn their cattle because they feel it detracts from the appearance.

- Proper timing and using the proper method for the age of the animal are critical considerations.

  - The recovery period for dehorning can reduce the rate of weight gain.

  - Dehorn calves as young as possible to reduce weight loss, bruising, and labor and equipment costs. A yearling calf will require about two weeks to regain its original weight following dehorning.

  - On older animals, the horns are filled with blood, so controlling the bleeding is a problem. On cattle two years and older, the horns are usually tipped.

- **Methods of dehorning**

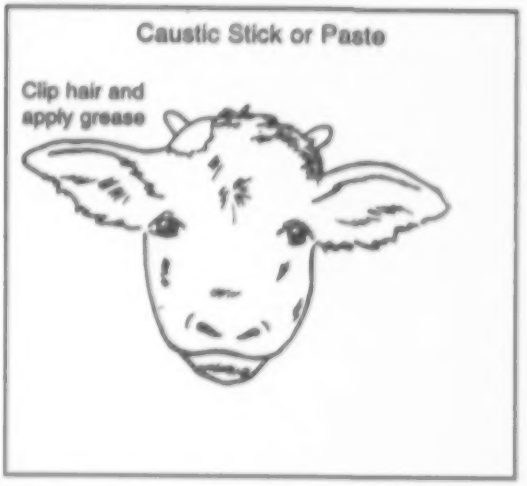
  - **chemical**

    - Caustic liquids, pastes, or sticks that stop horn growth permanently are used on calves three days to two weeks old, while their horns are in the button stage. Caustic potash (potassium hydroxide – KOH) or sodium hydroxide (NaOH)) are the most common caustics.

    - Chemical dehorning should be limited to small herds that can be kept under supervision.

    - Clip the hair around the button and apply a heavy layer of petroleum jelly on the clipped area to protect the skin and around the eyes. Rub the chemical over the button according to the manufacturer's instructions. (Using too much or too little will produce unsatisfactory results.) The tissue will be destroyed and a scab will form after six or eight hours and will drop off in about one to two weeks. Hair will grow over the treated area. Keep the calf out of the rain and away from the dam for 24 hours.

FIGURE 1



- **mechanical** – Various tools and devices are used to physically remove horns from cattle over two weeks old.

  ☞ **NOTE:** You will identify tools in objective 3 and learn how they are used in objective 4.

OBJECTIVE 2

State precautions for dehorning.

Required Activities/Resources
- Discuss the dangers of dehorning and the safety practices that can reduce or prevent injury.

WORDS YOU SHOULD KNOW	
scurs	horn-like growths attached only by soft tissue; can be inherited or caused by improper dehorning

- Disinfect equipment before and after each use to prevent infection and disease.
- Perform the operation carefully to prevent scurs/regrowth.
- Dehorn cattle as young as possible.
- Dehorn cattle in early spring or late fall to reduce insect trouble.

  ☞ **NOTE:** If you must dehorn during fly season, apply an insect repellent to the wounds.

OBJECTIVE 3

Required Activities/Resources
- Tools
- Study objectives 3 and 4 together.

Identify types of dehorners.

Your instructor will show you the dehorning equipment listed below. Study objective 4 to learn how the tools are used.

- hot iron
- spoon
- tube
- elastrator
- Barnes dehorner
- saw
- Keystone dehorner
- chemical dehorner (caustic stick, paste, or liquid)
- _____
- _____

OBJECTIVE 4

Required Activities/Resources
- Discuss advantages and disadvantages of each method.

Optional Activities/Resources
- Share personal experiences with these methods.
- Talk with a stock manager or veterinarian about dehorning.

Match mechanical dehorning tools to their descriptions.

- **Hot iron** (electric or nonelectric)
  - ☐ A soldering iron with a cone-shaped, hollow tip is applied over the budding horn button for 10-20 seconds. It sears and cauterizes the tissue at the horn base, killing the growth cells. The horn button falls off in four to six weeks.
  - ☐ The hot iron method is used on calves under five months old with horns less than 3/4" long.
  - ☐ Dehorning with a hot iron is a bloodless method.
  - ☐ The hot iron can be used for dehorning any time of year.

- **Dehorning spoon and dehorning tube**
  - Both tools cut the horn button from the skin.
  - Spoons and tubes are used on calves under 60 days old.
  - Tools must be disinfected before each use.
  - The dehorning spoon, also called a gouge, is used to dig out the horn.
  - The dehorning tube comes in four diameters, from 3/4" to 1⅛". With the calf restrained, select the correct size tube and place the cutting edge evenly over the horn and about 1/4" of skin. Push down and twist, cutting through the skin 1/8" to 3/8" deep. Holding the tube at a 45° angle, quickly turn and push on the cutting edge until the button comes off.

FIGURE 2

- **Elastrator**
  - The elastrator is a strong rubber ring slipped over the base of the horn, well down into the hairline.
  - The blood supply is cut off and the horn drops off in three to six weeks.
  - This is a bloodless method.
  - Elastration is probably the least desirable method.

- **Barnes dehorner**

FIGURE 3

  - Knife blades cut and lift the horns out by the roots and crush the blood vessels.
  - Barnes dehorners are used on calves of weaning age (six to eight months).
  - Excessive bleeding can be a problem.

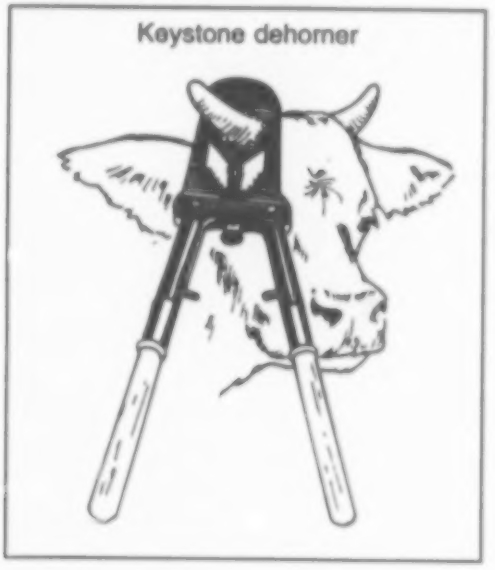
    ☞ **NOTE:** See objective 6 on how to stop bleeding after dehorning.

- **Saw and Keystone dehorner** (Figure 4)

  - Both tools remove the horn with about 1/4" to 1/2" of the skin to make certain that horn-forming cells are destroyed.
  - The Keystone dehorner is used for removing horns on younger cattle.
  - Electric or manual dehorning saws are used to remove the hard, brittle horns of mature cattle.
  - These tools are the most common methods of dehorning.
  - Bleeding can be a problem with older cattle because of the large number of blood vessels in the horn.

- Animals must be confined or restrained.

FIGURE 4



OBJECTIVE 5

Required Activities/Resources
- Discuss how the age of the animal, size of horns, equipment and labor affect the choice of dehorning method.

List factors that determine the appropriate method of dehorning.

- age of the animal
- size of the horns
- available equipment
- available labor

OBJECTIVE 6

Required Activities/Resources
- Demonstration

Select from a list ways to stop bleeding after dehorning.

☞ **NOTE:** Keep all animals that have been dehorned by any cutting method under close supervision. Watch for bleeding, infection, and insect infestation. If bleeding continues, call a veterinarian.

- Use a chemical blood stopper.
- Pack the horn cavity with cotton and tie with a tight bandage.

- Pick up the main artery under the cut with forceps and pull it until it breaks.

  ☞ **NOTE:** If bleeding continues, pull arteries that have not already been pulled.

- Tie a heavy string around the poll below the dehorned area.

- Sear the wound with a hot iron.

OBJECTIVE 7

Complete Job Sheet 1.

OBJECTIVE 8

Complete Job Sheet 2.

OBJECTIVE 9

Choose the word or phrase to complete statements about docking.

Optional Activities/Resources – Video

☞ **NOTE:** Review methods of animal restraint from Unit C-1, "Animal Health Care."

WORDS YOU SHOULD KNOW	
dock	to remove a lamb's tail
prolapse of the rectum	the rectum slips down from its normal position and protrudes through the anus
tetanus (lockjaw)	a wound infection disease that attacks the nervous system, causing severe muscle spasms, especially in the jaw

- **Advantages of docking**
  - Docked lambs are cleaner in the rear end and are less likely to get parasites and diseases.
  - Long tails interfere with breeding ewes.
  - Docked lambs present a more uniform and muscular appearance.
  - Docked lambs bring higher market prices.
  - The dressed carcass has a more attractive appearance.

- **Method**

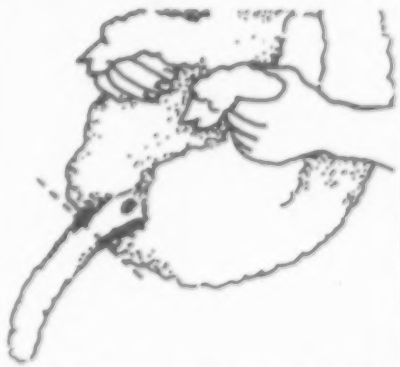
  - The tail is cut off at the first or second joint, where the two folds of skin join the tail, or about 1" to 1.5" from the body, using a knife or tools designed for docking.

  - Pull the tail skin toward the body. Remove the tail, leaving a stub about an inch long. When you release the tail, the skin will go back in place, covering the stub.

  - Pinch the skin together to close the arteries and prevent bleeding.

FIGURE 5

Correct location to dock the tail



1-1.5" from the body, or where the two folds of skin join the tail

- Lambs should be docked when they are between three and ten days old. Some managers castrate first and then dock in one handling.

OBJECTIVE 10

State precautions for docking.

Required Activities/Resources
- Discuss the precautions and the consequences of failing to follow them.

- **Always use good sanitation practices.**

  - Clean and disinfect the whole area surrounding the cut before and after docking.

  - Clean and disinfect all instruments after each use.

  - Clean and disinfect your hands before handling the next lamb.

- **Prevent infection.**
  - ☐ Use good disinfectant at docking.
  - ☐ Give a tetanus vaccination.

    ☞ **NOTE:** Give tetanus antitoxin (T.A.T) with all lamb surgery. If docking and castration are performed at the same time, only one dose of 150 to 200 I.U. of T.A.T. is required.

- **Prevent parasites.**

  EXAMPLES: screwworms, maggots
  - ☐ Dock lamb in early spring or late fall.
  - ☐ Use wound dressing.

- **Control blood loss.**
  - ☐ Use blood stopper for excessive bleeding.
  - ☐ Select a bloodless method of docking.
  - ☐ Dock lambs between three and ten days old.

- **Prevent prolapse of the rectum.** – Do not dock too high.

OBJECTIVE 11

Identify tools used in docking.

Required Activities/Resources
- Tools
- Study objectives 11 and 12 together.

Your instructor will show you the docking equipment listed below. Study objective 12 to learn how the tools are used.

- chisel
- emasculator
- elastrator
- pincher
- Burdizzo
- knife
- _____
- _____

OBJECTIVE 12

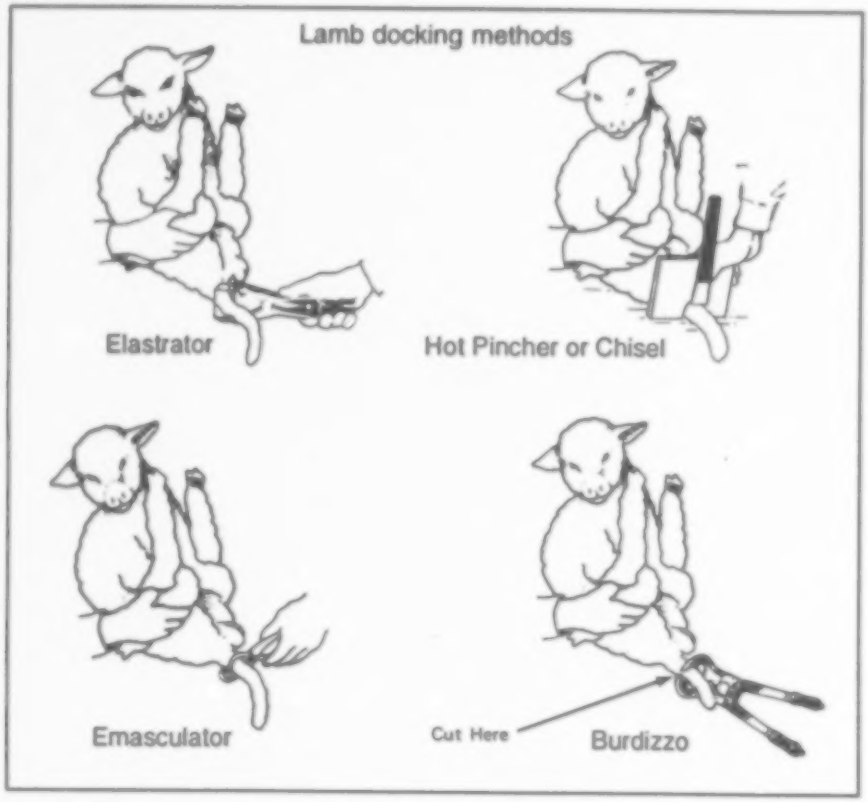
Match docking tools to their descriptions.

Required Activities/Resources
- Discuss the advantages and disadvantages of each method; demonstration.

Optional Activities/Resources
- Talk with a livestock manager or veterinarian about docking.

WORDS YOU SHOULD KNOW	
atrophy	a wasting away or decrease in size of body tissue

FIGURE 6



☑ **NOTE:** The emasculator, elastrator, Burdizzo, and knife are also used in castration.

- **Hot pincher or chisel**
  - The hot blades sear the wound, resulting in less blood loss and less danger of infection than with a knife; but the wound heals slower.
  - Heat the tool only until it glows a very dull red. Heating it beyond this point can cause profuse bleeding. Protect the buttocks using a board with a hole or slot that the tail can stick through. Work quickly and avoid any more burning than is necessary.

- Use the hot pincher or chisel to dock older lambs because they are more likely to bleed heavily.

- **Emasculator**

  - The emasculator has a dull edge that crushes the tissue and a sharp edge for cutting. Slip the emasculator over the tail to the place where the cut will be made. Squeezing the handles cuts the tail and crushes part of the tissue to reduce bleeding.

- **Elastrator**

  - The tool stretches a strong rubber ring that is placed at the point where the tail will be severed. When the band is released onto the tail, it cuts off the blood supply. The tail atrophies and falls off.

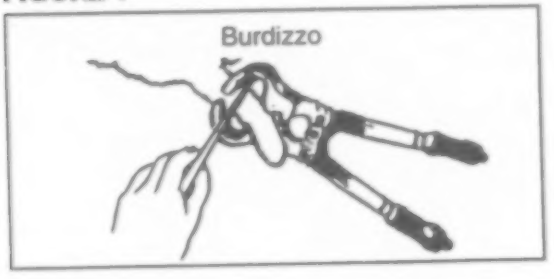
  - The elastrator method is bloodless.

  - If you have unsanitary conditions or the animal has diarrhea (scouring), cut off the tail after the ring has been placed.

- **Burdizzo**

  - The Burdizzo is a type of pincher. Close the jaws over the tail where the cut is to be made. Use a knife to cut off the tail *inside* the closed jaws.

FIGURE 7



  - The Burdizzo is a bloodless method.

- **Knife**

  - Restrain the lamb between your legs, hold the tail up, and cut where the two folds of skin join onto the tail.

OBJECTIVE 13

Complete Job Sheet 3.

OBJECTIVE 14

Complete Job Sheet 4.

OBJECTIVE 15

Choose the word or phrase to complete statements about castration.

Required Activities/Resources
- Discuss the differences in castrating younger and older animals.

Optional Activities/Resources
- Video

Start your discussion with the question, "What do I already know and what have I heard about the value and effects of castration for cattle, sheep, and swine?"

WORDS YOU SHOULD KNOW	
castration	removal of the testicles
scrotum	outside protective covering of the testicles
spermatic cord	suspends the testicles inside the scrotum
staggy	having the appearance of a mature male

- **Advantages of castration**
  - produces higher quality meat
  - aids in growth and fattening
  - makes livestock easier to handle
  - brings higher prices at market
  - prevents inferior males from breeding
  - in swine, eliminates boar odor in the meat
- Early spring and late fall are the best times for castrating because of the lower insect population. Infection from fly-borne diseases can be a major problem.
- As with docking, correct timing is important. Castration should be performed on animals as young as possible to reduce the amount of work, the possibility of excessive bleeding, and danger to the handler.

  ☑ **NOTE:** See objective 19 for the proper ages for castrating sheep, cattle, and swine.

- Bulls that are castrated after eight months of age become staggy and have a lower market value.
- Older bulls are dangerous to work with during castration.
- Older animals can have severe bleeding problems from castration.
- Older animals will lose weight because of the shock of castration.

- **Methods of castration**
  - **surgical** – The most common methods include cutting out all or part of the testicles with a knife or razor-blade tool.
  - **Burdizzo and elastrator** – These are external devices that don't remove tissue, but crush the spermatic cord and/or blood vessels; used for cattle and sheep.
  - **emasculator** – The emasculator has a dull edge that crushes the tissue to reduce bleeding and a sharp edge for cutting; used with a surgical method. (See Figure 10)
  - **chemical** – An injectable chemical castration solution for cattle is manufactured under the trade name Chem-Cast and is available through a veterinarian.

    ☑ **NOTE:** See objective 18 for detailed information about castration methods.

OBJECTIVE 16

State precautions and safety factors for castration.

Required Activities/Resources
- Discuss the consequences that can occur if these precautions and safety factors are not followed.

Optional Activities/Resources
- Demonstrate and compare the pressure and control required to use a sharp knife and dull knife.

WORDS YOU SHOULD KNOW	
cryptorchid	abnormal male sexual development in which one or both of the testicles are retracted into the abdomen
rupture (hernia)	protrusion of the intestine through an opening in the abdominal wall

- **Prevent infection.**
  - Use good sanitation techniques, as for docking.

- Inject antibiotics and antitoxins.

  ☑ **NOTE:** Administer T.A.T. (tetanus antitoxin) following all lamb surgery.

- Watch for signs of abnormal scrotum, such as rupture or cryptorchid.

  ☑ **NOTE:** Pigs with abnormal scrotums should be operated on by a veterinarian.

- **Prevent parasites.** (maggots)

  - Castrate at a time of year when the insect population is low.
  - Use a wound dressing.

- **Control stress.**

  - Castrate during mild weather.
  - Castrate only healthy animals.
  - Be aware of nervous conditions such as a pig with a quivering tail or ear.
  - Do not excite animals; remain calm.

- **Use restraints.**

  ☑ **NOTE:** Refer to the sections on restraints and restraining livestock in Unit C-1, "Animal Health Care."

  - headgate
  - calf cradle
  - ropes
  - manual restraints appropriate for the type and age of the animal

- **Observe safety factors.**

  - Handle and restrain animals with care to prevent injury to the animal or anyone present.

- ☐ Use the proper facilities and equipment when working livestock.
- ☐ Stay back out of the way to avoid being stepped on or kicked.

  ☞ **NOTE:** Most animals' reach extends farthest to the rear, not as far to the front, and very little to the sides.
- ☐ Use a sharp knife that won't close and is easy to handle.

  ☞ **NOTE:** A dull knife requires more pressure to cut, increasing the possibility of slipping, of irritating the animal, and increasing stress for the handler.

OBJECTIVE 17

Identify castration tools.

Required Activities/Resources
- Tools
- Study objectives 17 and 18 together.

Your instructor will show you the tools used for castrating sheep, cattle, and swine.

- knife
- single-edge razor blade
- Burdizzo
- elastrator
- emasculator
- scalpel
- _____
- _____

OBJECTIVE 18

Choose the word or phrase to complete statements about castration methods.

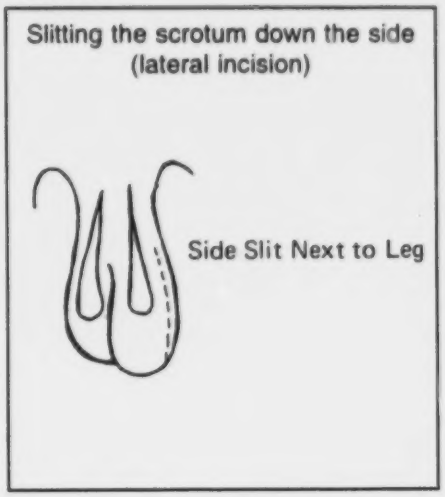
Required Activities/Resources
- Demonstration
- Discuss the advantages of each method.

Optional Activities/Resources
- Share personal experiences castrating cattle, sheep, and swine.

WORDS YOU SHOULD KNOW	
inguinal ring	the opening in the abdominal wall where the testes move from the body cavity into the scrotum

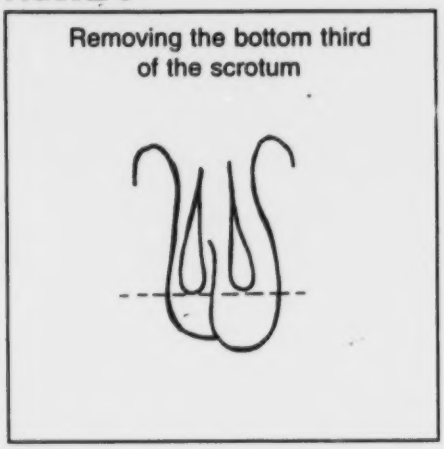
- **Slitting the scrotum down the side** (lateral incision method)
  - With the skin stretched tight over the right side of the right testicle, make an incision down the right side of the scrotum. Start a few inches above the top of the testicle and cut to a point below it.
  - The incision should be deep enough to cut through the membrane and long enough for good drainage.
  - Pull out the testicles through the incision, then scrape through the spermatic cord with a knife or clamp it with an emasculator.

FIGURE 8



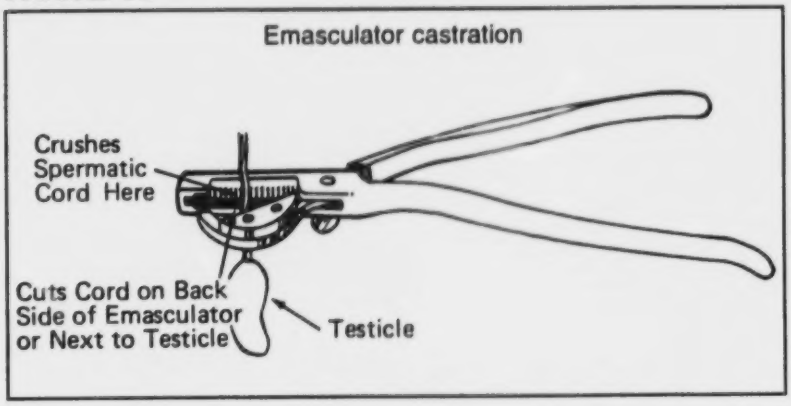
- **Removing the end of the scrotum** (end-incision method)
  - With the left hand, squeeze the scrotum so the testicles move upward. Cut off the lower third of the scrotum with a knife. Pull out the testicles. (Figure 9)
  - On calves up to 4 months old, pull the cord; on older calves and bulls, clamp it with an emasculator.
  - Infection is a danger with this method because the bottom of the scrotum heals together and stops the drainage.

FIGURE 9



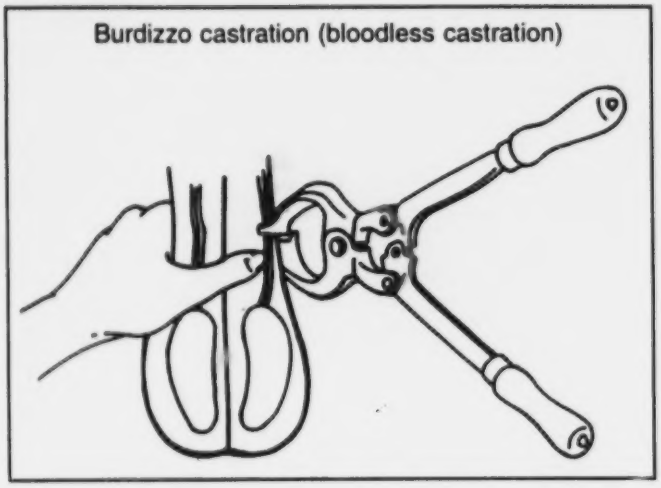
- **Emasculator**
  - Crushes a part of the spermatic cord while cutting and reduces the loss of blood.
  - The emasculator is used with a surgical method.

FIGURE 10



- **Burdizzo** (bloodless castration)
  - The Burdizzo crushes the spermatic cord and the blood vessels to the testicle without injuring the scrotum. (Figure 11)
  - Maneuver the cord as far as it will go to the side of the scrotum and clamp on the Burdizzo 1¾" to 2" above the testicle. Keep the handles tight for about 5 seconds. Move up or down the same cord about 1/4" and crush again to insure that the cord is closed. Repeat the procedure on the other cord.

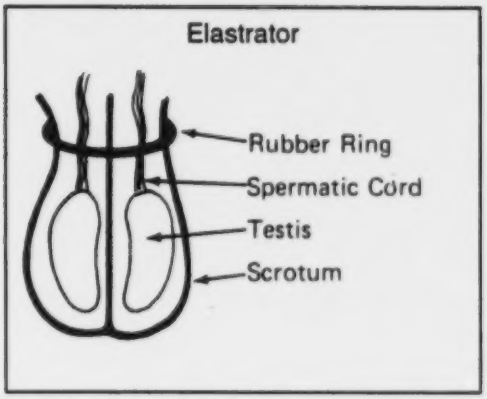
FIGURE 11



- Be sure the cord doesn't slip out and that the blood flow is maintained through the central portion of the scrotum.
- The testicles will atrophy in four to six weeks.
- Never try to pinch both cords at once.

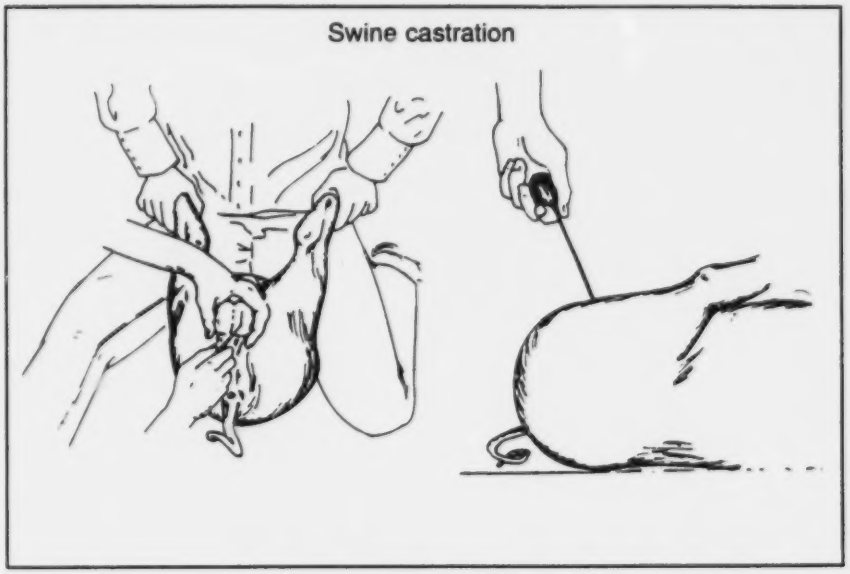
- **Elastrator**
  - The holder stretches a rubber band or ring that will fit over the scrotum of young animals. The ring cuts off circulation to the testicles and causes them to atrophy. (Figure 12)
  - Put both testicles through the ring and adjust the placement so the ring is at the lower end of the testicles. Release the ring.
  - The testicles will wither and fall off within a few weeks.
  - This is a bloodless method, but the testicles are sore and swell for the first few weeks the band is in place.

FIGURE 12



- **Castrating swine**
  - With the pig restrained, press the testicle(s) outward and use a sharp knife to slit the scrotum, either down the center or on each side. (Figure 13)

FIGURE 13



  - Make the cut(s) long enough for good drainage and deep enough to go through the scrotum and membrane.
  - On younger boars, break off the cord well forward or use backward tension and pull out the cord. If you don't keep a backward tension on the cord, the inguinal ring can tear and damage the intestines.

- On older boars, crush the cord with an emasculator.
- Pigs with cryptorchid or ruptured scrotum should be castrated by a veterinarian.
- Keep pigs off feed for several hours before castrating.
- Boars no longer used for breeding can be castrated a month before marketing.
- The stress of castration can undermine the effect of vaccines.

OBJECTIVE 19

State proper times and methods of castration for cattle, swine, and sheep.

Optional Activities/Resources
- Talk with livestock manager or veterinarian about castration.

☑ **NOTE:** Animals castrated later in life will have an increase in stress and blood loss.

Animal	Time of Castration	Method of Castration
cattle	birth to 12 weeks	• slit the scrotum down the sides (lateral incision) • remove the lower end of the scrotum (end-cut incision) • Burdizzo
	under 2 months	• elastrator
	up to 150 lbs	• injectable chemical
sheep	7-14 days	• remove the lower end of the scrotum • elastrator • Burdizzo
swine	early enough for the incision to heal before weaning (healing usually takes 2-3 weeks); may be as young as 5 days or up to 4 weeks	• use a knife; can make one cut or two

OBJECTIVE 20 **Complete Job Sheet 5.**

OBJECTIVE 21 **Complete Job Sheet 6.**

OBJECTIVE 22 **Complete Job Sheet 7.**

OBJECTIVE 23 **Discuss poultry debeaking, caponizing, wing treatments, and other production practices.**

Optional Activities/Resources
– Demonstration

(?) Birds are naturally cannibalistic. Stress factors such as crowding, overheating, starvation, too much light, or irregular feeding can trigger cannibalism. Stress behaviors among poultry include picking at the tail, feathers, vent, and toes. Discuss stress-related behaviors in sheep, cattle, and humans and what can be done to relieve the stress and control the behaviors.

WORDS YOU SHOULD KNOW	
cannibalism	repeatedly pecking and clawing other (usually weaker) birds, sometimes to death; usually caused by stress and overcrowding
caponizing	castrating a cockerel
cockerel	a young male domestic fowl
debeaking	removing part of the upper beak or part of both beaks
desnooding	removing the snood from turkeys (see *snood* below)
dubbing	removing all or part of the chicken's comb
poult	a young turkey
snood	mass of fleshy tissue where a turkey's beak attaches to its head

- **Debeaking**
  - Debeaking is a preventive control for cannibalism
  - Debeak day-old chicks and debeak again at 12-16 weeks, especially layers. You can debeak older birds when they are not in production.
  - Use a sharp knife; toenail clippers; or small, very sharp tin snips for small flocks.
  - Use a debeaking machine for large, commercial flocks.
  - Remove 1/2 to 2/3 of the upper beak and the top of the lower beak. If only the upper beak is cropped, the lower beak can grow so long that it interferes with eating.
  - Do not cut deep enough to cause bleeding. If bleeding occurs, sear the tip of the beak with a red-hot iron. Be careful not to burn the bird's tongue.
- **Caponizing**
  - advantages of caponizing birds
    - faster weight gain
    - do not develop male characteristics
    - have a smoother skin and flesh than intact males
    - do not fight
    - have a docile temperament
  - Caponize at three to five weeks of age.
  - Use a sharp knife to make a small incision between the last two ribs on one side or both sides. Remove both testicles.
- **Wing clipping**
  - Clipping the wings prevents chickens and turkeys from flying.
  - Remove the last joint of the wing when the chick or poult is 2-20 days old.
  - Clipping one wing is sufficient.

- **Wing notching**
  - Notching the wings is another method of preventing flight.
  - Bend the wing back at the last joint when the poult is five to six weeks old. Cauterize the break with a hot iron or debeaking machine.
  - Notching only one wing will prevent flight.
- **Dubbing**
  - advantages of dubbing
    - stops large combs from interfering with eating and drinking
    - reduces injury to combs from cages and equipment
    - reduces fighting by putting hens on equal social status
  - Clip the comb with curved manicure scissors when the chicks are one day old. There is practically no bleeding in young chicks and little pain or discomfort.
  - To control bleeding when dubbing older birds, withhold water for 12 hours: Feed vitamin K to promote clotting.
- **Desnooding**

FIGURE 14

- Desnooding helps prevent disease.
- Cut off the snood with manicure scissors when the poult is one day old.
- Remove the snood close to the skull.

JOB SHEET 1	*DEHORNING, DOCKING, AND CASTRATION*	**C-5**

Name _____

OBJECTIVE 7

Dehorn cattle using the Keystone or Barnes dehorner.

INTRODUCTION

Keystone and Barnes dehorners are most commonly used on younger cattle. Saws are used on mature cattle because their horns are more brittle.

Review animal restraints in Unit C-1, "Animal Health Care."

EQUIPMENT AND SUPPLIES

- disinfectant
- Keystone or Barnes dehorner
- forceps
- blood stopper
- wound dressing
- syringe of antibiotic

☞ **NOTE:** Read the label to determine the correct type and dosage.

- cotton
- method of restraint (manual restraint for a small animal, squeeze chute or calf cradle for an older animal)
- hot iron
- animal for dehorning

PROCEDURE

Yes No

1. Restrain calf. ____ ____

Functional Reading
- Follow written instructions
- Interpret graphics and symbols

☞ **NOTE:** Make sure you don't choke the calf down during dehorning.

Life Science
- Investigate/apply principles of anatomy/physiology

Job Acquisition/ Development
- Master specific job task/procedure
- Practice good work habits/attitudes

2. Inspect the horns to determine the size of dehorner to use. ____ ____

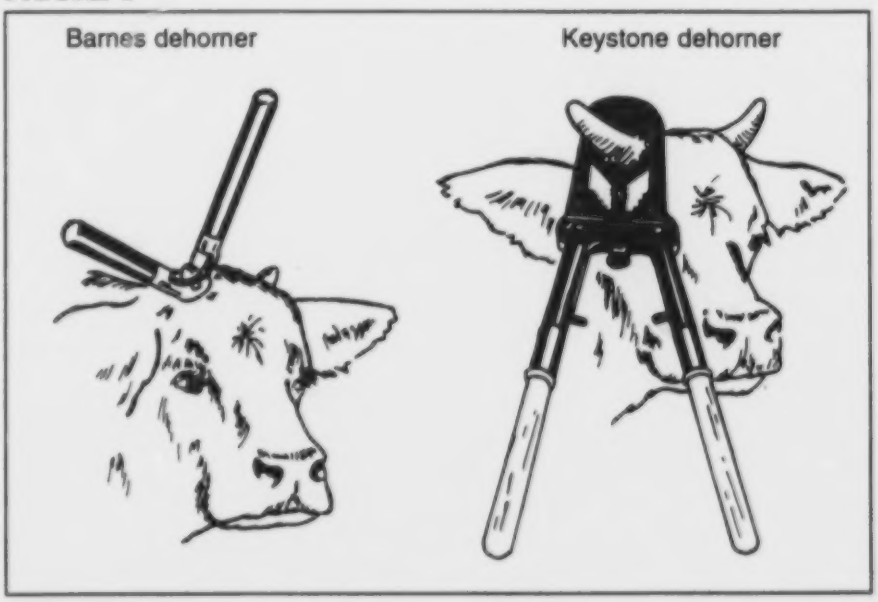
   ☛ **NOTE:** Select a size that will remove 1/4" to 1/2" of the skin around the horn base.

3. Wash your hands and the dehorner with disinfectant. ____ ____

4. Open the dehorner and place it straight down over the horn so you can make an even cut, removing 1/4" to 1/2" of the skin around the horn base. (Figure 1) ____ ____

   ☛ **NOTE:** When using a saw, remove 1/4" to 1/2" of the skin around the horn base with a sawing action.

FIGURE 1



5. Close the dehorners quickly to sever the horn. ____ ____

	Yes	No
6. Control excessive bleeding.	____	____
a. Pull the artery with the forceps until it breaks.	____	____
☛ **NOTE:** The broken artery will retract and go back into the soft tissue and the bleeding will stop. If you can't pull the artery, use a hot iron to sear the wound.		
b. Apply cotton to the horn cavity when the cavity is large.	____	____
c. Apply the blood stopper.	____	____
7. Repeat the procedure for the second horn.	____	____
8. Check the animal for excessive bleeding.	____	____
9. Apply wound dressing according to the label directions.	____	____
10. Give an antibiotic according to label directions.	____	____
☛ **NOTE:** Place the animal in shelter in bad weather.		
11. Have your instructor check your work.	____	____
12. Release the animal.	____	____
13. Clean the area, disinfect and put away tools.	____	____

SKILL TEST RECORD

EVALUATOR'S COMMENTS

_____

_____

_____

PRODUCT EVALUATION

Evaluator note: Rate the student on the following criteria by circling the appropriate numbers. Each criterion must receive a rating of "3" or higher to demonstrate student mastery. (See Key below.) A student who is unable to demonstrate mastery should review the material and submit another product for evaluation.

Criteria:

Observed safety precautions	4	3	2	1
Effectively dehorned animal	4	3	2	1
Handled animal properly	4	3	2	1

AVERAGE RATING

Evaluator note: To obtain an average rating for the Competency Profile, total the points in Product Evaluation and divide by the total number of criteria. Circle the rating on the Key.

KEY

4 **Skilled** – Can perform job with no additional training.
3 **Moderately Skilled** – Has performed job during training program; limited additional training may be required.
2 **Limited Skill** – Has performed job during training program; additional training is required to develop skill.
1 **Unskilled** – Is familiar with process, but is unable to perform job.

EVALUATOR'S COMMENTS

JOB SHEET 2	*DEHORNING, DOCKING, AND CASTRATION*	**C-5**

Name _____

OBJECTIVE 8

Dehorn cattle with a hot iron.

EQUIPMENT AND SUPPLIES

- electric dehorner or hot iron
- source of heat if using a hot iron (i.e. propane torch)
- calf for dehorning

☞ **NOTE:** The hot iron method can be used only on young calves under five months old with horns less than 3/4" long.

PROCEDURE

Functional Reading
- Follow written instructions
- Interpret graphics and symbols

Life Science
- Investigate/apply principles of anatomy/physiology

Job Acquisition/ Development
- Master specific job task/procedure
- Practice good work habits/attitudes

	Yes	No
1. Restrain the animal.	____	____
2. Plug in the electric dehorner or heat the hot iron to cherry red.	____	____
3. Place the tip directly over the horn button.	____	____
4. Hold in place for 10 to 20 seconds.	____	____
5. Rotate the dehorner or iron back and forth, forming a ring at the base of the button.	____	____

☞ **NOTE:** On older calves the cap of the horn may pop off. When you hear it pop, flip the cap off.

6. Remove the dehorner.	____	____
7. Sear any soft, bloody tissue with the end of the dehorner to control bleeding.	____	____
8. Allow the dehorner to reheat.	____	____
9. Repeat the procedure on the second horn.	____	____

10. Have your instructor check your work. ____ ____

11. Release the animal. ____ ____

12. Clean up the work area and put away tools. ____ ____

SKILL TEST RECORD

EVALUATOR'S COMMENTS

_____

_____

_____

PRODUCT EVALUATION

Evaluator note: Rate the student on the following criteria by circling the appropriate numbers. Each criterion must receive a rating of "3" or higher to demonstrate student mastery. (See Key below.) A student who is unable to demonstrate mastery should review the material and submit another product for evaluation.

Criteria:

Observed safety precautions	4	3	2	1
Effectively dehorned calf	4	3	2	1
Handled animal properly	4	3	2	1

AVERAGE RATING

Evaluator note: To obtain an average rating for the Competency Profile, total the points in Product Evaluation and divide by the total number of criteria. Circle the rating on the Key.

KEY

4 **Skilled** – Can perform job with no additional training.
3 **Moderately Skilled** – Has performed job during training program; limited additional training may be required.
2 **Limited Skill** – Has performed job during training program; additional training is required to develop skill.
1 **Unskilled** – Is familiar with process, but is unable to perform job.

EVALUATOR'S COMMENTS

JOB SHEET 3	*DEHORNING, DOCKING, AND CASTRATION*	**C-5**

Name _____

OBJECTIVE 13

Dock lambs using the elastrator.

EQUIPMENT AND SUPPLIES

- elastrator with band
- means of restraint
- syringe of tetanus antitoxin, cotton swab, and alcohol

☑ **NOTE:** Follow label directions for injection type and dosage.

- lambs for docking

PROCEDURE

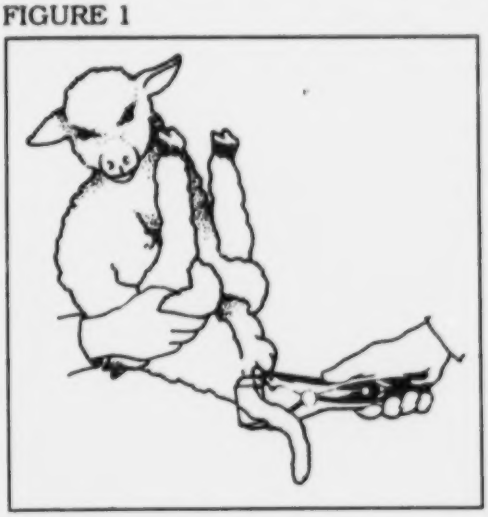
Functional Reading
- Follow written instructions
- Interpret graphics and symbols

Life Science
- Investigate/apply principles of anatomy/physiology

Job Acquisition/ Development
- Master specific job task/procedure
- Practice good work habits/attitudes

	Yes	No
1. Restrain the animal. (Figure 1)	____	____
2. Draw the tail through the ring of the elastrator to 1 to 1½" from the body or where the two folds of flesh join the tail. (Figure 1)	____	____

FIGURE 1



☑ **NOTE:** Show sheep are docked closer.

	Yes	No
3. Release the ring.	____	____
4. Give the tetanus antitoxin according to label directions.	____	____
☑ **NOTE:** Review injection sites and injection types in Unit C-4, "Vaccination and Drugs."		
5. Have your instructor check your work.	____	____
6. Release the animal.	____	____
7. Clean the work area, clean or dispose of tools properly.	____	____

SKILL TEST RECORD

EVALUATOR'S COMMENTS

_____

_____

_____

PRODUCT EVALUATION

Evaluator note: Rate the student on the following criteria by circling the appropriate numbers. Each criterion must receive a rating of "3" or higher to demonstrate student mastery. (See Key below.) A student who is unable to demonstrate mastery should review the material and submit another product for evaluation.

Criteria:

Observed safety precautions	4	3	2	1
Handled animal properly	4	3	2	1
Effectively docked tail	4	3	2	1

AVERAGE RATING

Evaluator note: To obtain an average rating for the Competency Profile, total the points in Product Evaluation and divide by the total number of criteria. Circle the rating on the Key.

KEY

4 **Skilled** – Can perform job with no additional training.
3 **Moderately Skilled** – Has performed job during training program; limited additional training may be required.
2 **Limited Skill** – Has performed job during training program; additional training is required to develop skill.
1 **Unskilled** – Is familiar with process, but is unable to perform job.

EVALUATOR'S COMMENTS

_____

_____

_____

JOB SHEET 4	*DEHORNING, DOCKING, AND CASTRATION*	**C-5**

Name _____

OBJECTIVE 14

Dock lambs using the Burdizzo.

EQUIPMENT AND SUPPLIES

- means of restraint
- Burdizzo
- knife
- disinfectant such as 5% solution of carbolic acid or iodine and water
- syringe of tetanus antitoxin, cotton swab, and alcohol

  NOTE: Follow label directions for injection type and dosage.

- lambs for docking

PROCEDURE

Functional Reading
- Follow written instructions
- Interpret graphics and symbols

Life Science
- Investigate/apply principles of anatomy/physiology

	Yes	No
1. Restrain the lamb. (Figure 1)	____	____

FIGURE 1

Restrain the lamb

Job Acquisition/ Development
- Master specific job task/procedure
- Practice good work habits/attitudes

	Yes	No
2. Wash your hands, the Burdizzo, and the lamb's tail with disinfectant.	____	____
3. Push the skin back toward the lamb's body.	____	____
4. Place the Burdizzo on the tail at the point where the tail is to be severed, about 1 to 1½" from the body; shorter for show lambs.	____	____
5. Close the Burdizzo.	____	____
6. Cut off the tail between the closed jaws of the Burdizzo with the knife. (Figure 2)	____	____

FIGURE 2

7. Remove the tail and leave the Burdizzo in place for about one minute to prevent bleeding.	____	____
8. Give the tetanus antitoxin according to label directions.	____	____

☑ **NOTE:** Review injection types and sites in Unit C-4, "Vaccination and Drugs."

9. Have your instructor check your work.	____	____
10. Release the animal.	____	____
11. Clean the work area and clean or dispose of equipment properly.	____	____

SKILL TEST RECORD

EVALUATOR'S COMMENTS

_____

_____

_____

PRODUCT EVALUATION

Evaluator note: Rate the student on the following criteria by circling the appropriate numbers. Each criterion must receive a rating of "3" or higher to demonstrate student mastery. (See Key below.) A student who is unable to demonstrate mastery should review the material and submit another product for evaluation.

Criteria:

Observed safety precautions	4	3	2	1
Effectively docked lamb	4	3	2	1
Handled animal appropriately	4	3	2	1

AVERAGE RATING

Evaluator note: To obtain an average rating for the Competency Profile, total the points in Product Evaluation and divide by the total number of criteria. Circle the rating on the Key.

KEY

4 **Skilled** – Can perform job with no additional training.
3 **Moderately Skilled** – Has performed job during training program; limited additional training may be required.
2 **Limited Skill** – Has performed job during training program; additional training is required to develop skill.
1 **Unskilled** – Is familiar with process, but is unable to perform job.

EVALUATOR'S COMMENTS

_____

_____

_____

JOB SHEET 5	*DEHORNING, DOCKING, AND CASTRATION*	**C-5**

Name _____

OBJECTIVE 20

Castrate cattle using the knife method.

EQUIPMENT AND SUPPLIES

- disinfectant
- sharp knife
- wound dressing
- means of restraint, such as calf cradle, a squeeze chute, or a person to manually restrain the calf
- syringe of antibiotic, cotton swab, and alcohol

☞ **NOTE:** Read the antibiotic label to determine the type of injection and dosage.

PROCEDURE

Functional Reading
- Follow written instructions
- Interpret graphics and symbols

Life Science
- Investigate/apply principles of anatomy/physiology

Job Acquisition/ Development
- Master specific job task/procedure
- Practice good work habits/attitudes

	Yes	No
1. Restrain a small calf manually and restrain a larger calf with a calf cradle or squeeze chute.	____	____
2. Wash your hands and the knife with disinfectant.	____	____
3. Wash and disinfect the calf's scrotum.	____	____

	Yes	No
4. Remove the lower third of the scrotum with the knife. (Figure 1)	___	___

FIGURE 1

5. Pull the testicles out of the scrotum one at a time and scrape the spermatic cord at least three inches above each testicle. (Figure 2)	___	___

FIGURE 2

6. Check the animal for excessive bleeding. If bleeding persists, consult a veterinarian.	___	___
7. Apply wound dressing according to the label directions.	___	___
8. Give the antibiotic according to label directions.	___	___
9. Have your instructor check your work.	___	___
10. Release the animal.	___	___
11. Clean the work area and clean or dispose of equipment properly.	___	___

SKILL TEST RECORD

EVALUATOR'S COMMENTS

_____

_____

_____

PRODUCT EVALUATION

Evaluator note: Rate the student on the following criteria by circling the appropriate numbers. Each criterion must receive a rating of "3" or higher to demonstrate student mastery. (See Key below.) A student who is unable to demonstrate mastery should review the material and submit another product for evaluation.

Criteria:				
Observed safety precautions	4	3	2	1
Effectively castrated calf	4	3	2	1
Handled animal appropriately	4	3	2	1

AVERAGE RATING

Evaluator note: To obtain an average rating for the Competency Profile, total the points in Product Evaluation and divide by the total number of criteria. Circle the rating on the Key.

KEY

4 **Skilled** – Can perform job with no additional training.
3 **Moderately Skilled** – Has performed job during training program; limited additional training may be required.
2 **Limited Skill** – Has performed job during training program; additional training is required to develop skill.
1 **Unskilled** – Is familiar with process, but is unable to perform job.

EVALUATOR'S COMMENTS

_____

_____

_____

JOB SHEET 6	*DEHORNING, DOCKING, AND CASTRATION*	**C-5**

Name _____

OBJECTIVE 21

Castrate swine using the knife method.

EQUIPMENT AND SUPPLIES

- disinfectant
- sharp knife
- wound dressing
- syringe of antibiotic, cotton swab, and alcohol

☛ **NOTE:** Read the antibiotic label to determine the correct type and dosage.

- means of restraint (Figure 1A or 1B)
- pig ready for castration

PROCEDURE

	Yes	No
1. Restrain the pig.	____	____

FIGURE 1A

FIGURE 1B

Reading Comprehension
- Gain factual information

Functional Reading
- Follow written instructions

Life Science
- Investigate/apply principles of anatomy/physiology

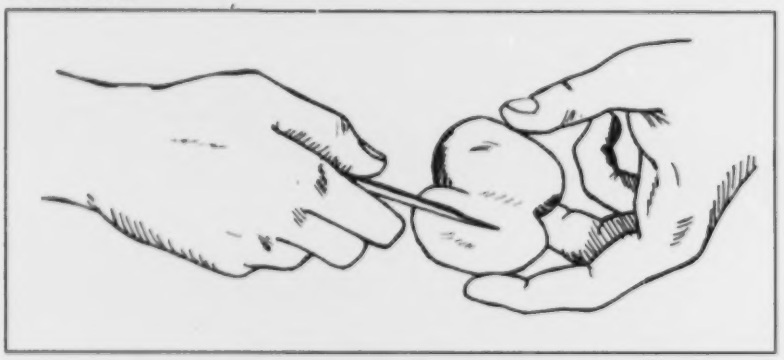
Job Acquisition/ Development
- Master specific job task/procedure
- Practice good work habits/attitudes

	Yes	No
2. Wash your hands and the knife with disinfectant.	____	____
3. Scrub the scrotum with disinfectant.	____	____
4. Hold the scrotum between your thumb and index finger. (Figure 2)	____	____
5. Push the testicle to the pig's crotch area near the base of the ham.	____	____

☑ **NOTE:** If the incision is made too high toward the tail, the wound will not drain properly. If the incision is made too low, there will be increased chances of herniation.

6. Make an incision on the scrotum parallel to the testicle. (Figure 2)	____	____

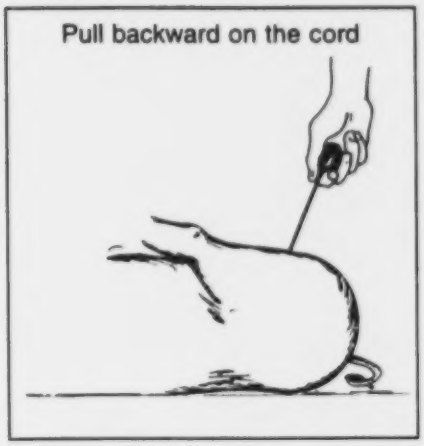
FIGURE 2



7. Remove one testicle and scrape or pull out the spermatic cord, maintaining a backward tension. (Figure 3)	____	____

☑ **NOTE:** Use an emasculator on larger pigs.

FIGURE 3



	Yes	No
8. Repeat the procedure on the second testicle.	____	____
9. Check for excessive bleeding.	____	____
☑ **NOTE:** If bleeding persists, consult a veterinarian.		
10. Apply wound dressing according to the label directions.	____	____
11. Give the antibiotic injection according to label directions.	____	____
☑ **NOTE:** Review injection types and sites in Unit C-4, "Vaccination and Drugs."		
12. Have your instructor check your work.	____	____
13. Release the animal.	____	____
14. Clean the work area and clean and dispose of equipment properly.	____	____

SKILL TEST RECORD

EVALUATOR'S COMMENTS

_____

_____

_____

PRODUCT EVALUATION

Evaluator note: Rate the student on the following criteria by circling the appropriate numbers. Each criterion must receive a rating of "3" or higher to demonstrate student mastery. (See Key below.) A student who is unable to demonstrate mastery should review the material and submit another product for evaluation.

Criteria:

Observed safety precautions	4	3	2	1
Effectively castrated pig	4	3	2	1
Handled animal appropriately	4	3	2	1

AVERAGE RATING

Evaluator note: To obtain an average rating for the Competency Profile, total the points in Product Evaluation and divide by the total number of criteria. Circle the rating on the Key.

KEY

4 **Skilled** – Can perform job with no additional training.
3 **Moderately Skilled** – Has performed job during training program; limited additional training may be required.
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EVALUATOR'S COMMENTS

JOB SHEET 7	DEHORNING, DOCKING, AND CASTRATION	C-5

Name _____

OBJECTIVE 22

Castrate sheep using the elastrator method.

EQUIPMENT AND SUPPLIES

- elastrator with band
- means of restraint (Figure 1)
- syringe of antibiotic, cotton swab, and alcohol

☑ **NOTE:** Use an antibiotic on larger lambs. Read the antibiotic label to determine the correct type and dosage.

- lamb ready for castration

PROCEDURE

Functional Reading
- Follow written instructions
- Interpret graphics and symbols

Life Science
- Investigate/apply principles of anatomy/physiology

Job Acquisition/ Development
- Master specific job task/procedure
- Practice good work habits/attitudes

	Yes	No
1. Restrain lamb. (Figure 1)	____	____
2. Place band on elastrator.	____	____
3. Open the elastrator and place the band over the scrotum with the elastrator teeth pointed toward the lamb.	____	____

FIGURE 1

	Yes	No
4. Push both testicles down into the scrotum.	____	____
5. Release the band.	____	____
6. Check to be sure both testicles are in the scrotum with the band between the lamb and the testicles.	____	____
☞ **NOTE:** Be sure you don't get a teat under the band.		
7. Have your instructor check your work.	____	____
8. Release the animal.	____	____
9. Clean the work area and clean or dispose of equipment properly.	____	____

SKILL TEST RECORD

EVALUATOR'S COMMENTS

_____

_____

_____

PRODUCT EVALUATION

Evaluator note: Rate the student on the following criteria by circling the appropriate numbers. Each criterion must receive a rating of "3" or higher to demonstrate student mastery. (See Key below.) A student who is unable to demonstrate mastery should review the material and submit another product for evaluation.

Criteria:

Observed safety precautions	4	3	2	1
Effectively castrated sheep	4	3	2	1
Handled animal appropriately	4	3	2	1

AVERAGE RATING

Evaluator note: To obtain an average rating for the Competency Profile, total the points in Product Evaluation and divide by the total number of criteria. Circle the rating on the Key.

KEY

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3 **Moderately Skilled** – Has performed job during training program; limited additional training may be required.
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1 **Unskilled** – Is familiar with process, but is unable to perform job.

EVALUATOR'S COMMENTS

_____

_____

_____

OBJECTIVE SHEET

HOOF TRIMMING, SHEARING, AND ANIMAL IDENTIFICATION

C-6

INTRODUCTION

Providing adequate maintenance and care for your stock will help insure its quality and value. You have to trim the hooves on cattle and sheep in order to prevent poor posture and performance and maintain healthy animals. Shearing not only generates income, it also affects lambing behavior, comfort, and cleanliness. Identifying your animals enables you to recognize stock and helps you in your record keeping. From old-time methods like branding to high-tech electronic monitoring, animal identification can deter theft and aid in recovering stolen livestock and proving ownership.

PREREQUISITE

UNIT C-1 "Animal Health Care"

FOCUS ASSIGNMENTS

Reading Comprehension
- Gain factual information
- Analyze cause and effect
- Draw conclusions

Language
- Use standard grammar, spelling, and capitalization
- State ideas clearly

Composition
- Use complete sentences

FOCUS ASSIGNMENTS	
PREREADING:	Read the first page and the text in Figure 1 of *Livestock Branding in Oklahoma* by T.D. Rich and Ellis Freeny, OSU Extension Facts No. 3255.
WRITING:	Draw your own brand, then write a short essay (a paragraph to a page) discussing why you chose that design.

UNIT OBJECTIVE

After completing this unit, you will show the following competencies by mastering the activities on the Assignment and Job Sheets and by scoring at least 85% on the Written Test.

SPECIFIC OBJECTIVES

1. Choose the word or phrase to complete statements about hoof trimming.
2. State precautions and safety considerations for hoof trimming.
3. Identify hoof trimming tools.
4. Match hoof trimming tools to their uses.
5. Select trimming procedures according to the animal's structural factors.
6. Trim a calf's hooves using hoof nippers and an electric grinder. (Job Sheet 1)
7. Choose the word or phrase to complete statements about shearing.
8. State good shearing practices.
9. State practices for maintaining shearing equipment.
10. Shear a lamb. (Job Sheet 2)
11. Choose the word or phrase to complete statements about animal identification.
12. Identify basic tools used in livestock identification.
13. Complete a chart on methods of identification for cattle, swine and sheep.
14. Label common earmarks for cattle.
15. Select from a list tips for hot iron branding.
16. Brand cattle using a hot iron. (Job Sheet 3)
17. Tattoo a calf. (Job Sheet 4)
18. Nose print cattle. (Job Sheet 5)
19. State rules for ear notching pigs.
20. Interpret swine ear notches. (Assignment Sheet)
21. Ear notch a pig. (Job Sheet 6)
22. List guidelines for ear-tagging sheep.
23. Tag a sheep. (Job Sheet 7)

INFORMATION SHEET	HOOF TRIMMING, SHEARING, AND ANIMAL IDENTIFICATION	C-6

OBJECTIVE 1

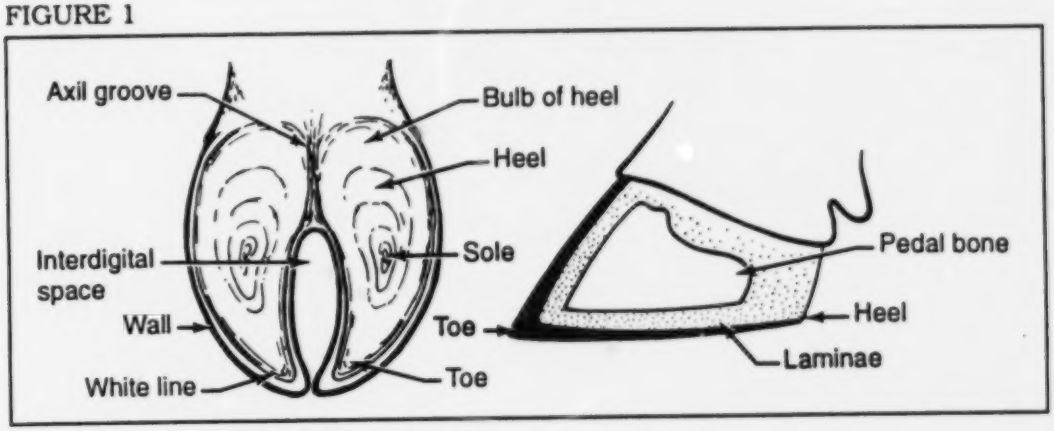
Optional Activities/Resources – Video

Choose the word or phrase to complete statements about hoof trimming.

WORDS YOU SHOULD KNOW	
laminae or quick	sensitive tissues that lie just below the outer layer of hard hoof tissue

- **Parts of the hoof** (Figure 1)

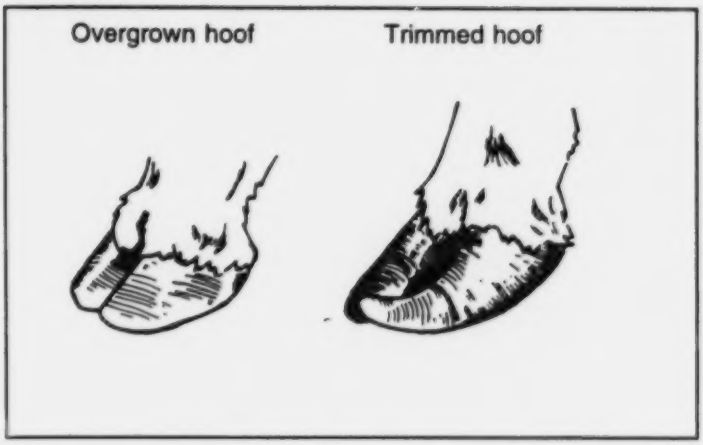
FIGURE 1



- Soft ground surfaces do not wear down normal hoof growth and the hoof sidewalls become overgrown. (Figure 2)

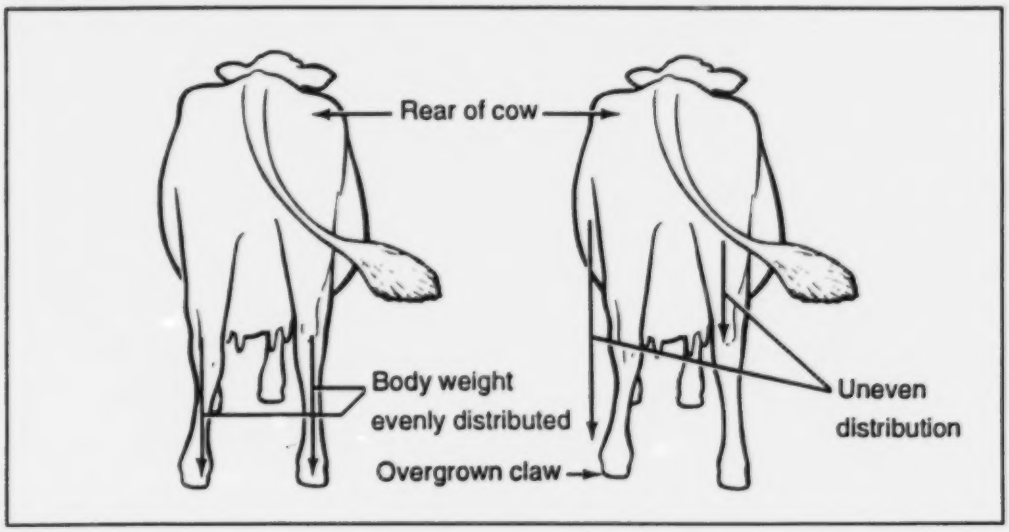
☞ **NOTE:** Animals on wet ground become susceptible to foot rot, especially sheep. Foot rot is an inflammation that affects the tissues between the toes and can be infectious. It can become a serious problem for sheep and cattle producers who don't provide good, consistent foot care.

FIGURE 2



- As the hooves grow, normal weight distribution is affected. The laminae will become irritated, causing the weight to shift even further. (Figure 3)

FIGURE 3

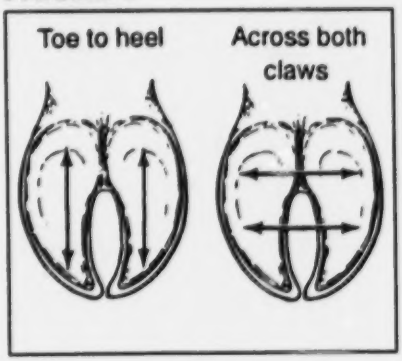


- **Results of poor hoof care**
  - Animals can develop poor posture and go lame.
  - Irritated hooves can crack and are open to infection and disease.
  - Animals in need of hoof trimming may consume less food, reducing their gain.

- Milk and sperm production are reduced when walking becomes difficult or painful.
- Males may refuse or be unable to mate.

- **Correct trimming**
  - Have good cattle-handling facilities available.
  - Use sharp knives and tools.
  - Level the hoof toe-to-heel and across both claws to create an even load-bearing surface. (Figure 4)

FIGURE 4



OBJECTIVE 2

Required Activities/Resources
- Discuss the dangers of hoof trimming and the safety practices that can reduce or prevent injury.

State precautions and safety considerations for hoof trimming.

- Disinfect equipment before and after each use to prevent infection and disease.
- Restrain the animal properly.

  ☑ **NOTE:** Refer to Unit C-1 for safety and restraining guidelines.
- Clean the hoof with a clean brush and clean water.

  ☑ **NOTE:** Using an unclean brush and water can spread dermatitis or other diseases.
- If serious overgrowth has occurred, reshape the hooves slowly, over several sessions, to prevent tenderness and lameness.

- Do not cut into the quick. Cut only until a pink coloration appears.

OBJECTIVE 3

Identify hoof trimming tools.

Required Activities/Resources
- Tools
- Study objectives 3 and 4 together.

Your instructor will show you hoof trimming tools. Study objective 4 to learn how the tools are used.

- electric grinder
- hoof rasp
- hoof knife
- hoof nippers
- chisel
- hoof trimmer
- _____
- _____

OBJECTIVE 4

Match hoof trimming tools to their uses.

Required Activities/Resources
- Discuss the advantages and disadvantages of each tool

Optional Activities/Resources
- Share personal experiences with these methods.
- Invite a stock manager or veterinarian to discuss hoof trimming and care.

- **electric grinder** – smoothes and shapes the hoof
- **hoof rasp** – smoothes and shapes the hoof

  NOTE: Whether to use a rasp or a grinder is a matter of personal preference. The electric grinder gives a more professional look.

- **hoof knife** – cleans dirt and manure from the hoof

- **hoof nippers** – clips back the majority of the hoof growth (Figure 5)

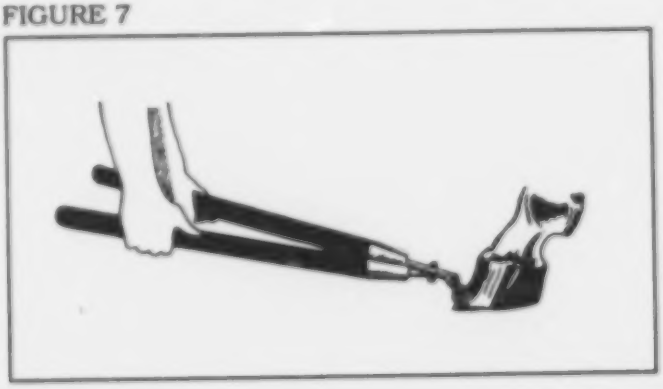
FIGURE 5

- **chisel** – chips off the animal's toes (Figure 6)

FIGURE 6

- **hoof trimmer** – trims the animal's toe with minimum restraint (Figure 7)

FIGURE 7



OBJECTIVE 5

Optional Activities/Resources
- Visit a production operation to look at structural factors.

Select trimming procedures according to the animal's structural factors.

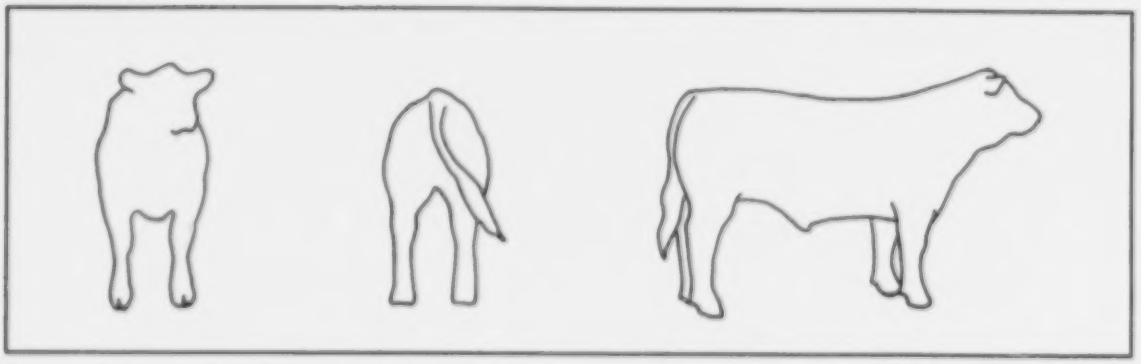
Cattle

Correct structure is fundamental to efficient beef production. Select calves that have straight legs. Regular hoof trimming onl helps to keep a calf straight legged and will not correct a structural defect completely. Hoof trimming will only minimize a defect.

- The side toward which the toe points should be trimmed shorter.

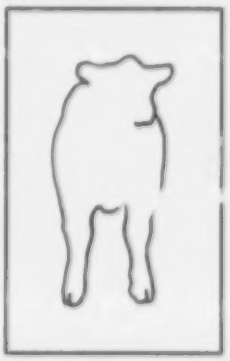
- **correct trimming** – Trim and shape the hoof evenly and level the bottom of the hoof. (Figure 8)

FIGURE 8



- **toes out** – Trim the inside hoof as short as possible and then trim the outside hoof longer than the hoof on the inside on the front legs. (Figure 9)

FIGURE 9



- **toes in** – Trim the outside hoof as short as possible and then trim the inside hoof longer than the outside of the hoof on the front legs. (Figure 10)

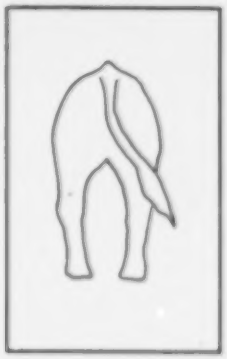
FIGURE 10

- **cow-hocked** – Trim the outside hoof as short as possible and then trim the inside hoof longer on the rear legs. (Figure 11)

FIGURE 11

- **wide at the hocks** – Trim the inside hoof as short as possible and then trim the outside hoof longer on the rear legs. (Figure 12)

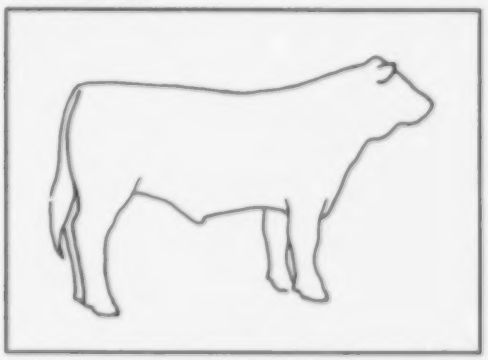
FIGURE 12



- **sickle-hocked and back at the knees** – Trim the toes as short as possible and leave the heel. (Figure 13)

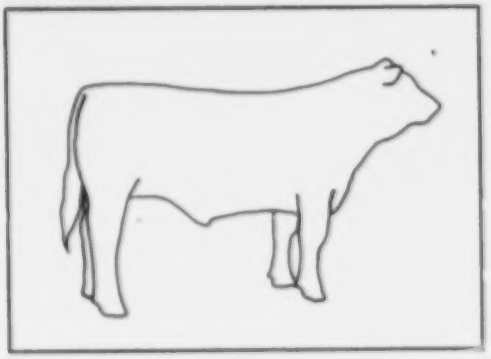
☞ **NOTE:** This will get the calf up on its toes.

FIGURE 13



- **post-legged and buck-kneed** – Trim the heels as short as possible and leave more toe. (Figure 14)

FIGURE 14



OBJECTIVE 6

Complete Job Sheet 1

OBJECTIVE 7

Choose the word or phrase to complete statements about shearing.

Optional Activities/Resources
- Video
- Handout
- Ask a stock manager to demonstrate shearing techniques and methods.

WORDS YOU SHOULD KNOW	
shearing	removing the wool crop
summer shearing	shearing all of the lamb in early summer; enables lambs to tolerate hot weather better and develop faster than unshorn lambs
tagging	removing the wool from the crotch, over the dock, and down the back of the hind legs
winter shearing	removing the wool from the neck area; causes ewes to go into the barn on cold nights during lambing

- Shearing is usually done by professional shearers.
- Shearing is performed one or two times per year, 6-12 months apart.

- Shearing increases wool profitability by reducing the amount of hay, manure, and other matter in the wool.
- Tagging, or shearing before lambing, helps the lamb find the teats and nurse more easily and makes it easier to monitor the ewe's progress.
- Wool is removed as one piece and is bundled for sale.
- Black, white, and lamb's wool should all be bundled and stored separately.

  ☛ **NOTE:** Black wool will mix in and contaminate your white wool. If you are selling your wool yourself, you should also separate it into fine and medium grades. The Handout has more information on grading.

- Winter shearing is desirable because it:
  - saves space
  - encourages animals to go into the barn during lambing
  - enables animals to stay dryer
  - enables lambs to find the teats more easily
- Wool in Oklahoma is sold to Mid-State Wool Growers through their representatives throughout the state
  - Blackwell
  - Byron
  - Colbert
  - Hydro
  - Muskogee
  - Mutual
  - Newkirk

OBJECTIVE 8

Required Activities/Resources
- Discuss safety practices during shearing.
- Study objectives 8 and 9 together.

Optional Activities/Resources in Instructor's Guide

State good shearing practices.

- Hold the sheep in a position that insures that its skin will be stretched tight on the part of the body being shorn.
- Make each stroke with the clippers as long as possible.
- Keep the ends of the teeth of the clippers on the sheep's skin throughout every stroke.
- Keep your shearing equipment in good condition.

☞ **NOTE:** See objective 9.

- Work on a clean, smooth surface.
- Disinfect blades between animals to prevent transmission of infectious diseases.
- Strive for thoroughness and evenness.

☞ **NOTE:** Speed is not important. It takes twelve months to grow a fleece of wool, so taking a little extra time in shearing and putting up the wool in an attractive manner is time well spent.

- Shearing should take place only when the wool is dry.
- When ewes or lambs are sheared, they must be handled carefully. Use balance, rather than force, to position the animals.

☞ **NOTE:** If you don't handle the animal properly, you can accidently cut a lamb, cause a ewe to abort (miscarry), or cut the hamstring.

OBJECTIVE 9

Optional Activities/Resources
- Demonstrate lubricating shearing equipment.
- Display blade types and sizes and discuss the benefits and problems associated with each.

State practices for maintaining shearing equipment.

- Keep equipment well lubricated.
- Use clean oil; remove old or darkened oil from equipment.

☞ **NOTE:** Dark oil will discolor the wool.

- Replace bent, chipped, or broken combs and blades.

- Use the proper size and shape razor, comb, and blade.
- Clean all wool from the razor after shearing black wool.

OBJECTIVE 10

Complete Job Sheet 2.

OBJECTIVE 11

Choose the word or phrase to complete statements about animal identification.

Required Activities/Resources
- Discuss the benefits and problems associated with each identification method.

WORDS YOU SHOULD KNOW	
ear notching	cutting slots in the ear for permanent identification
freeze branding (cryobranding)	using an extremely cold iron to brand permanently
hot iron branding	using a hot iron to burn a permanent scar for identification
noseprinting	making an ink blot impression of the lines in the animal's nose, much like fingerprinting to identify humans
paint branding	using an iron coated with wet paint to temporarily brand livestock
tagging	using metal or plastic tags
tattooing	using instruments equipped with needle points and rubbing ink to pierce and permanently stain the skin

- **Reasons to identify animals**
  - providing proof of ownership
  - identifying an animal's age
  - tracking breeding results
  - documenting the pedigree

- **Regulations**

  - The fee for recording brands in Oklahoma is $15.00 and must be renewed in those years ending in zero and five.

  - Western cattle states provide for the recording of brands.

  - The Cattleman's Association Brand Division approves applications for a brand and issues a certificate.

    ☑ **NOTE:** Applications may be obtained from the Oklahoma Cattleman's Association, 2500 Exchange Avenue, Oklahoma City, Oklahoma; county extension offices; and county sheriff offices. Three possible brands and positions must be listed on the application.

  - In Oklahoma, registration of a brand is not required by law; however, if a question of ownership arises, a registered brand takes precedence and is considered evidence of ownership.

  - Brands may be registered for these six positions only:

    ☑ **NOTE:** A seventh location, the left jaw, is reserved for "B" and "T" brands, indicating cattle reactive to brucellosis or tuberculosis.

    - left shoulder
    - left rib
    - left hip
    - right shoulder
    - right rib
    - right hip

  - Regulations state that the size of the brand should not be less than three inches in length or diameter. For practical purposes, most brands are four to five inches in size.

  - Registration must be confined to one brand location. If the brand is used in two locations, it will require an additional registration.

  - A minimum of two units or digits are required for registration.

- ☐ Secure a bill of sale when buying branded livestock.

  ☑ **NOTE:** Specific brands should show on the bill of sale. This is your title. You would never purchase an automobile without securing the title.

OBJECTIVE 12

Identify basic tools used in livestock identification

Required Activities/Resources
– Tools

Your instructor will show you identification tools.

- electric branding iron
- tattooing pliers
- tagging pliers
- ear notching pliers
- knife
- hot iron

  ☑ **NOTE:** Use hot irons made of iron, steel, or stainless steel. Stainless steel is noted for its ability to withstand extreme heat and for its durability. Copper irons are not recommended because they burn up often and have to be replaced.

- hot iron heater
- _____
- _____

OBJECTIVE 13

Complete a chart on methods of identification for cattle, swine, and sheep. (Table 1)

Optional Activities/Resources
- Review restraint methods used for each species.

☛ **NOTE:** Many stock managers tattoo all animals in addition to tagging, ear marking, or other methods because tags can get lost.

TABLE 1

Method	Cattle	Sheep	Swine
hot iron branding	x		
freeze branding	x		
paint branding	x	x	x
tattooing ear or lip	x	x	x
tagging[1]	x	x	x
noseprinting	x	x	
ear notching	x	x	x
neck chains or straps	x		
horn brands	x		
electronic transmitters[2]	x	x	x

[1] Tags have the advantage of being easily seen and the animal can be identified without restraint. Tags are usually placed in the ear or in the nose. Some stock managers cut a section of skin to make dewlap and wattle tags.

[2] One type of electronic device consists of a swallowed radio transmitter that lodges in the second stomach and broadcasts a specific signal on demand. Another type uses a silicone-coated minicircuit implanted under the skin and powered by a microwave beam from a portable receiver.

OBJECTIVE 14

Required Activities/Resources
– Transparency Master 1

Label common earmarks for cattle. (Figures 15-23)

You will see a transparency of common earmarks.

- **underbit**

FIGURE 15

- **overbit**

FIGURE 16

- **swallow fork**

FIGURE 17

- **split**

FIGURE 18

- **bobbed or cropped**

FIGURE 19

- **tipped**

FIGURE 20

- **underslope**

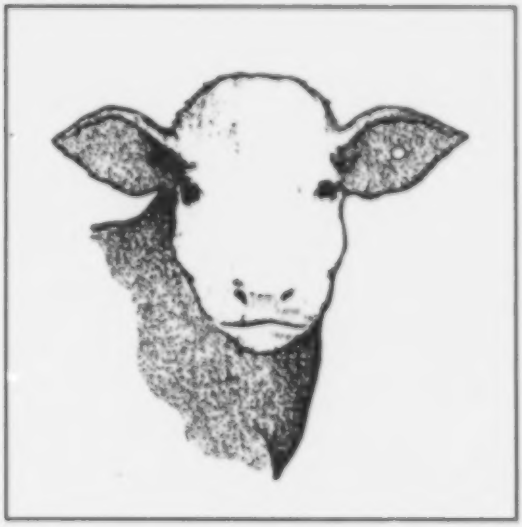
FIGURE 21

- **overslope**

FIGURE 22

- **hole**

FIGURE 23



OBJECTIVE 15

Select from a list tips for hot iron branding.

Optional Activities/Resources
- Share your personal branding experiences with the students.
- Talk with a stock manager or veterinarian about branding.
- Video
- Design a personal brand.

- The iron should be heated until it is the color of ashes.
- Acids and other branding fluids are not recommended.
- The brand should be the color of saddle leather.
- Burn only the outer layer of skin and no deeper.
- When the iron is the right temperature, hold it in place for three to five seconds.
- The iron is too hot when the hair catches fire.
- Irons that are too hot blotch the brand and are hard to read.
- Rock the iron to assure a burn on all parts of the brand.
- Simple brand patterns are best.
- Blotching occurs when two parts of an iron come together.

  EXAMPLE: The two bars on the "X" concentrate the heat in the center. To reduce the heat, a 1/4-inch gap is left on the branding side of the iron where the two legs of the "X" meet.

- Use the appropriate size iron (3-5 inches) for the size of the animal.
- Clip the brand area when animals have a heavy or soiled hair coat.
- Branding on any part of a previous brand is a violation of branding laws.
- Apply oil or grease to the branded area to encourage smoother, faster peeling.

OBJECTIVE 16

Complete Job Sheet 3.

OBJECTIVE 17

Complete Job Sheet 4.

OBJECTIVE 18

Complete Job Sheet 5.

OBJECTIVE 19

State rules for ear notching pigs.

Required Activities/Resources
- Transparency Masters 2, 3, and 4

Optional Activities/Resources
- Discuss why tracking litter number and litter position number is important.
- Video

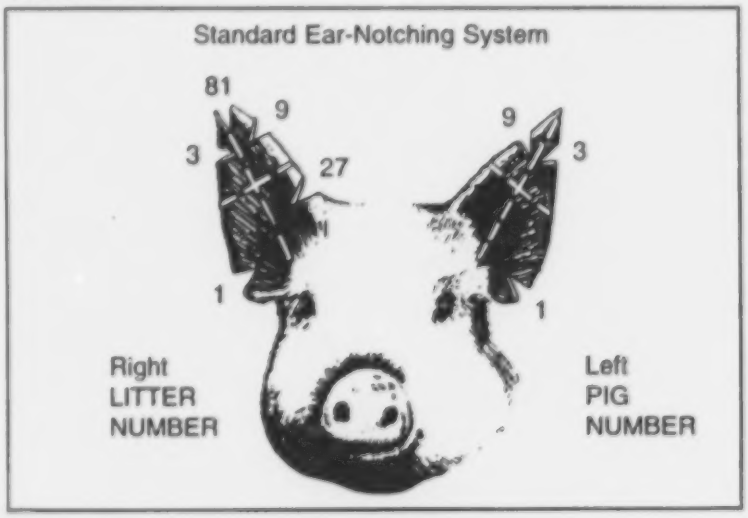
You will see three transparencies showing standard ear notching.

- Each ear is divided into four quadrants. (Figure 24)

NOTE: The value of each notch in the lower quarter near the head is 1. The value of each notch in the lower quarter away from the head is 3. Each notch in the upper quarter away from the head represents 9. Each notch in the upper quarter near the head stands for 27. The tip of the ear is 81.

- The ears are "read" by adding the values of the notches. (Figure 24)

FIGURE 24



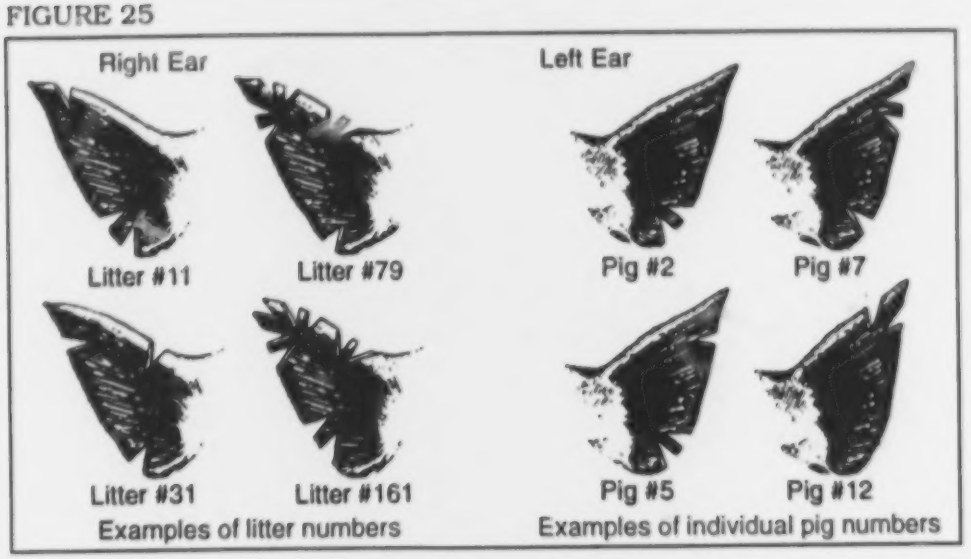
- The litter number is placed in the pig's right ear.
- The pig number is placed in the pig's left ear.
- Pigs in the same litter will have identical notches in the right ear.
- Pigs in the same litter will have different notches in the left ear.

- The litter of the first sow to farrow is usually designated as litter number one.

  EXAMPLE: All pigs in litter number one will have a "1" notched in the right ear. If there were eight pigs in the litter, each pig would be notched accordingly, "2", "3", "4" and so on, in the left ear. Pig #2 from that litter would have two notches in the quadrant closest to the head. Pig #11 would have one notch in the upper, outer quadrant, and two notches in the lower, inner quadrant. See Figure 25.

- Each successive litter is assigned a number in order of farrowing. (Figure 25)

FIGURE 25



- Use the proper size ear notcher.

  ☞ **NOTE:** Use baby-pig ear notchers on pigs up to five weeks old. Use larger ear notchers on larger pigs.

- Some pure-breed associations use special numbering systems.

OBJECTIVE 20 **Complete Assignment Sheet 1.**

OBJECTIVE 21 **Complete Job Sheet 6.**

OBJECTIVE 22

List guidelines for ear-tagging sheep.

Optional Activities/Resources
- Discuss benefits and problems associated with each type of tag.
- Tools used for each tag type.

- Tags should be inserted 2-3 days to 2-3 weeks after birth.
- Tags can be self-piercing or can require that a hole be punched in the ear before insertion.
- Instruments and tags must be clean before insertion.

  ☛ **NOTE:** Self-piercing tags normally come already coated with antibiotics, but clean techniques are still important in preventing infection.

- Tags must be appropriate in size and shape for the age of the animal, size of the ear, and usefulness at the site.
- Insertion should be through the cartilage; avoid injuring veins.

OBJECTIVE 23

Complete Job Sheet 7.

ASSIGNMENT SHEET

HOOF TRIMMING, SHEARING, AND ANIMAL IDENTIFICATION

C-6

Name _____ Score _____

OBJECTIVE 20

Interpret swine ear notches.

INSTRUCTIONS

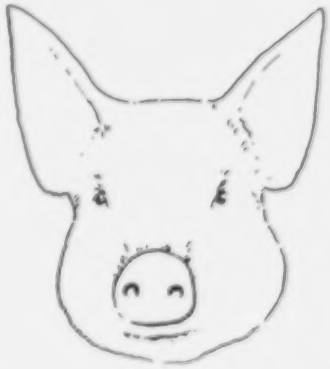
Use a pen to draw ear notches in the proper positions on the drawings below.

☛ **NOTE:** The first number is the litter number and the second number is the pig number.

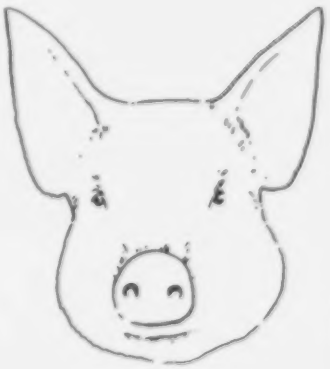
Functional Reading
- Interpret graphics and symbols

Cognitive Activities
- Transfer knowledge/training to new situations

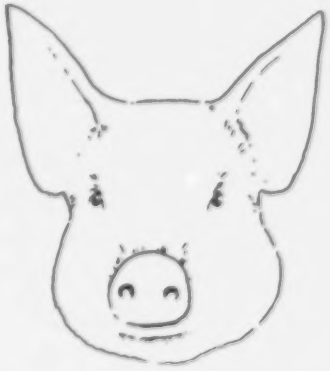
1. Ear notch pig 4-5.



2. Ear notch pig 26-17.

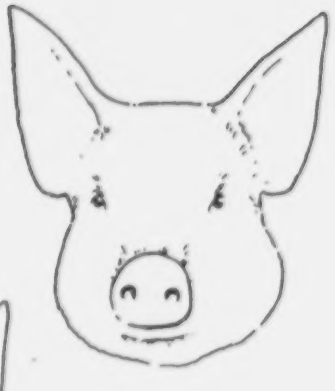


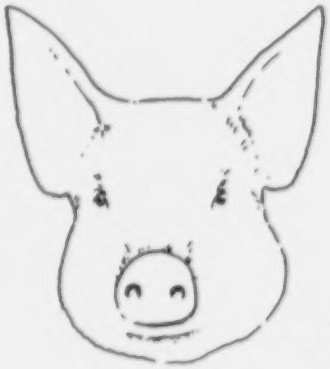
3. Ear notch pig 2-7.



1433

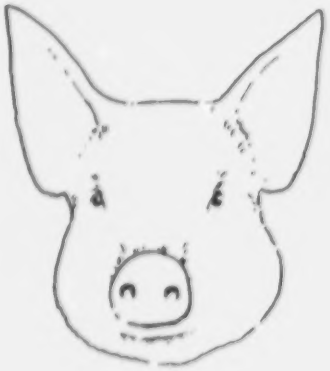
4. Ear notch pig 11-13





5. Ear notch pig 3-6.

6. Ear notch pig 16-17.



7. Read the ear notching for the following pigs.

a. _____

b. _____

c. _____

JOB SHEET 1	HOOF TRIMMING, SHEARING AND ANIMAL IDENTIFICATION	C-6

Name _____

OBJECTIVE 6

Trim a calf's hooves using hoof nippers and an electric grinder.

☞ **NOTE:** A show animal should be trimmed at least three to four weeks before a show in case it develops tenderness or lameness from the trimming.

EQUIPMENT AND SUPPLIES

- method of restraint
- hoof nippers
- hoof knife
- electric grinder
- calf

PROCEDURE

Functional Reading
- Follow written instructions
- Interpret graphics and symbols

Job Acquisition/ Development
- Master specific job task/procedure
- Practice good work habits/attitudes

	Yes	No
1. Restrain the calf.	____	____
2. Clean the hoof with a hoof knife.	____	____
3. Observe the calf and analyze its structure for correct trimming.	____	____
4. Clip the hoof with hoof nippers to correct the calf's structure.	____	____

☞ **NOTE:** See objective 5 for trimming procedures according to the animal's structural characteristics.

5. Smooth and shape the hoof with an electric grinder. (Figure 1)	____	____

☞ **NOTE:** Most cattle turn in between the toes. Correct this condition by removing the excess hoof between the toes with an electric grinder.

FIGURE 1

	Yes	No
6. Repeat the procedure for the other hoof.	____	____
7. Have your instructor check your work.	____	____
8. Clean the work area and clean and put away tools.	____	____

SKILL TEST RECORD

EVALUATOR'S COMMENTS

_____

_____

_____

PRODUCT EVALUATION

Evaluator note: Rate the student on the following criteria by circling the appropriate numbers. Each criterion must receive a rating of "3" or higher to demonstrate student mastery. (See Key below.) A student who is unable to demonstrate mastery should review the material and submit another product for evaluation.

Criteria:

Observed safety precautions	4	3	2	1
Successfully trimmed hooves	4	3	2	1
Handled animal appropriately	4	3	2	1

AVERAGE RATING

Evaluator note: To obtain an average rating for the Competency Profile, total the points in Product Evaluation and divide by the total number of criteria. Circle the rating on the Key.

KEY

4 **Skilled** – Can perform job with no additional training.
3 **Moderately Skilled** – Has performed job during training program; limited additional training may be required.
2 **Limited Skill** – Has performed job during training program; additional training is required to develop skill.
1 **Unskilled** – Is familiar with process, but is unable to perform job.

EVALUATOR'S COMMENTS

JOB SHEET 2

HOOF TRIMMING, SHEARING AND ANIMAL IDENTIFICATION

C-6

Name _____

OBJECTIVE 10

Shear a lamb.

EQUIPMENT AND SUPPLIES

- sheep shearing machine or clippers
- lamb in full fleece
- clean work area
- clipper lubricant

PROCEDURE

Functional Reading
- Follow written instructions
- Interpret graphics and symbols

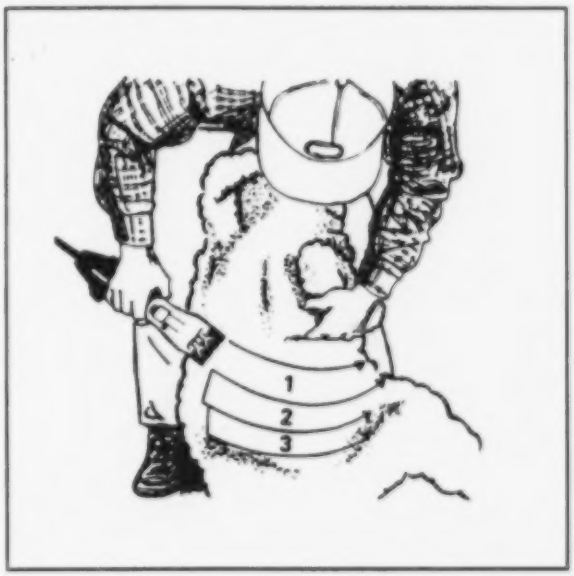
Job Acquisition/ Development
- Master specific job task/procedure
- Practice good work habits/attitudes

	Yes	No
1. Support the lamb firmly between your knees.	____	____
2. Rest the sheep's foreleg on your left side to tighten the skin on its belly.	____	____
3. Make the first stroke of the clippers straight down on the right side of the brisket to the open flank area. (Figure 1)	____	____

FIGURE 1

	Yes	No
4. Make the second stroke on the left side of the brisket down under the left front leg. (Figure 1)	____	____
5. Follow with strokes three and four to the left flank area. (Figure 1)	____	____
6. Hold the lamb's left front leg with your left wrist, leaving your left hand free to tighten the skin on the belly area; continue strokes as shown. (Figure 2)	____	____

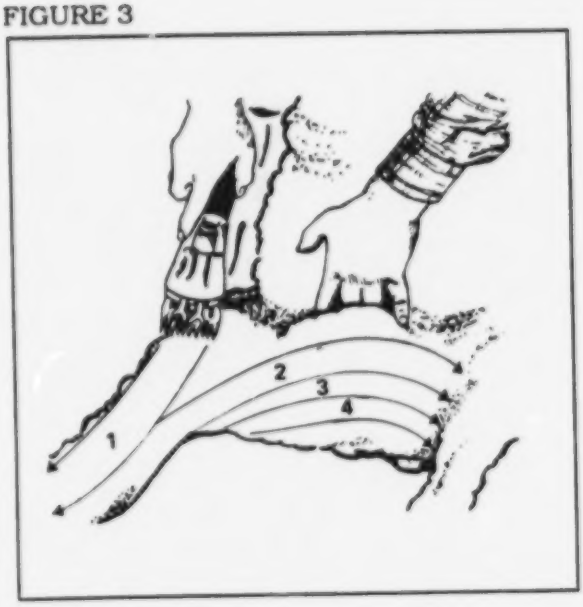
FIGURE 2



	Yes	No
7. Stroke out the inside of the right back leg and then start up and back around the udder. (Figure 3)	____	____

CAUTION: SHEAR THE BELLY CAREFULLY. You can cut the teats on a ewe or the sheath on a ram if you are not careful.

FIGURE 3



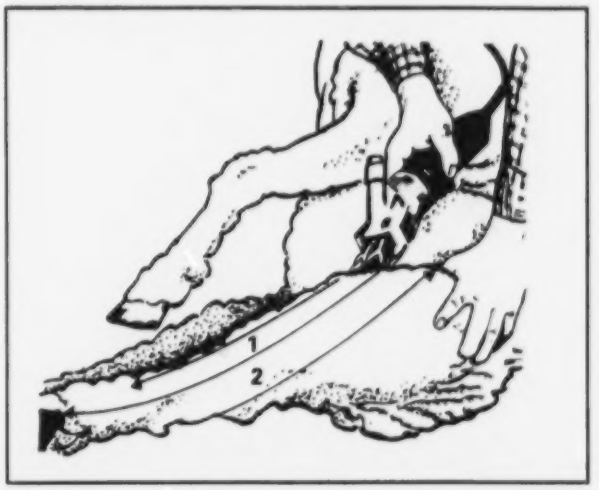
	Yes	No
8. With the left hand, apply pressure to the left stifle joint (the joint above the hock) to make the lamb hold its leg out straight; continue strokes as shown. (Figure 4)	____	____

☑ **NOTE:** The lamb's right front leg has dropped between your legs. Move your right leg back a few inches to help turn the lamb.

FIGURE 4

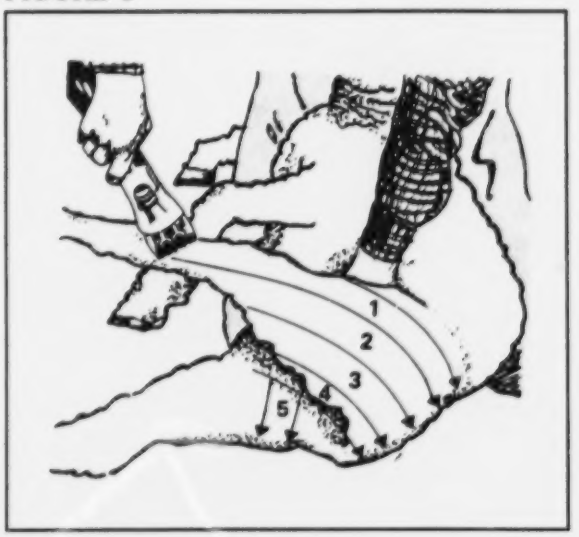
	Yes	No
9. Apply pressure on the right stifle joint to make the lamb hold its leg straight out.	____	____
10. Shear out the top of the leg and then start at the toe and go back up to clean the flank area. (Figure 5)	____	____

FIGURE 5



11. Hold the lamb fully relaxed against your legs and apply pressure in the flank; continue strokes as shown. (Figure 6)	____	____

FIGURE 6



	Yes	No
12. Drop your wrist and position the comb at the top of the tail. (Figure 7)	____	____
13. Enter the wool and shear forward along the backbone, cleaning all the wool forward from the tail. (Figure 7)	____	____

FIGURE 7

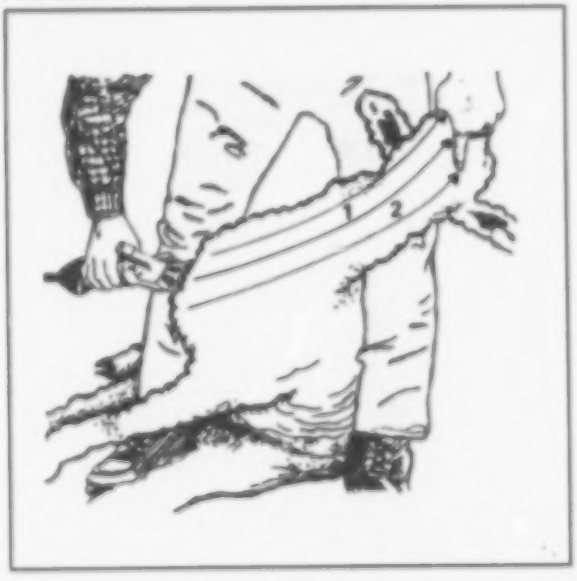
14. Shift your left hand to the lamb's head without changing the lamb's position and shear the top knot (tuft of hair at the top of the head). (Figure 8)	____	____

☞ **NOTE:** End your strokes on an imaginary line between the front side of the ears.

FIGURE 8

	Yes	No
15. Straighten the lamb, putting your left foot close to the lamb's hip and your right foot between its legs in the crotch. (Figure 9)	____	____
16. Turn the clippers to the right as the first stroke is ending by the lamb's chin so that the wool along the top side of the stroke breaks off and you can see where to make the second stroke. (Figure 9)	____	____

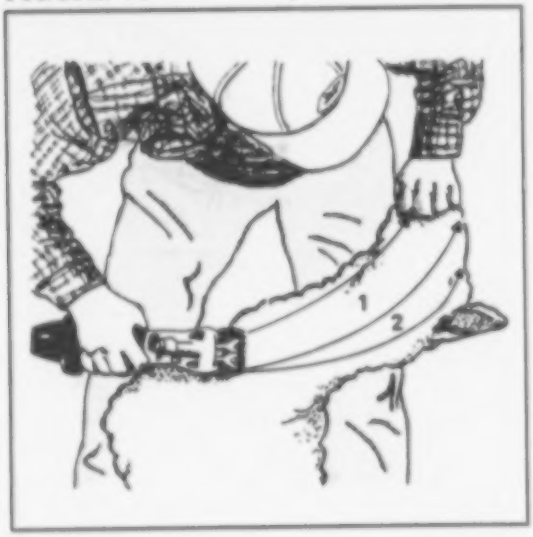
FIGURE 9



	Yes	No
17. Turn the lamb's head so the nose is up and the right side is against your leg; hold the lamb's body firmly between your knees. (Figure 10)	____	____

☛ **NOTE:** Shift your left hand toward the nose as you complete the strokes along the jaw.

FIGURE 10

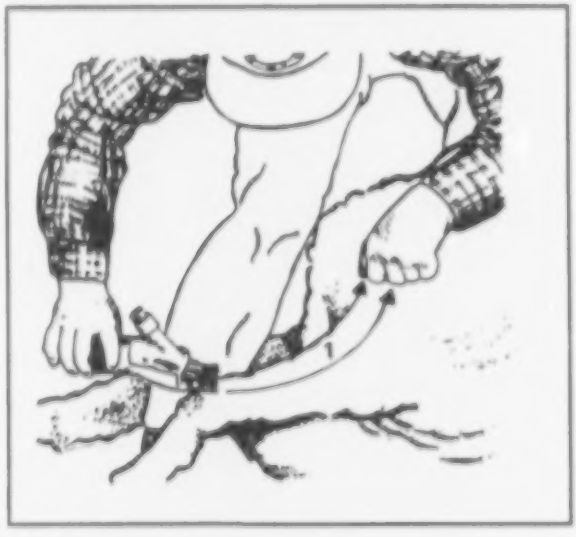


18. Complete the last stroke up the neck, removing the wool to the base of the left ear.	____	____
19. Hold the lamb's head against your leg with the heel of your hand and grasp the ear. (Figure 11)	____	____
20. Shear around the ear as shown. (Figure 11)	____	____

FIGURE 11

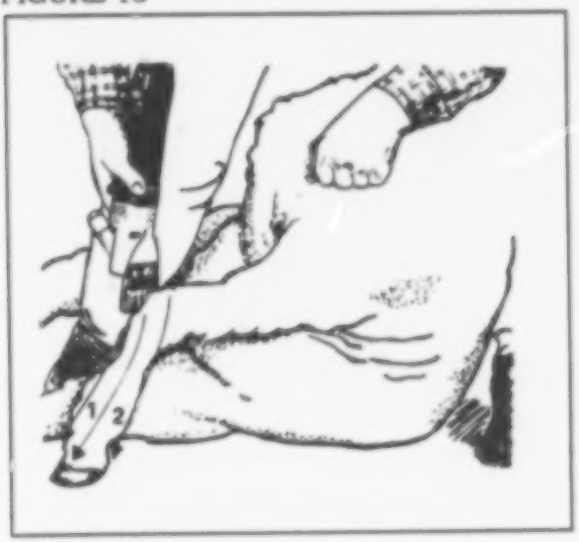
	Yes	No
21. Hold the lamb's body between your knees and hold it's head against your left leg with your elbow. (Figure 12)	___	___
22. Use your left hand to stretch the skin on the shoulder. (Figure 12)	___	___
23. Start your stroke at the knee and shear upward to clean the tags (dung-covered wool) on the front of the shoulder. (Figure 12)	___	___

FIGURE 12



	Yes	No
24. Take the boots off with downward strokes. (Figure 13)	____	____

FIGURE 13

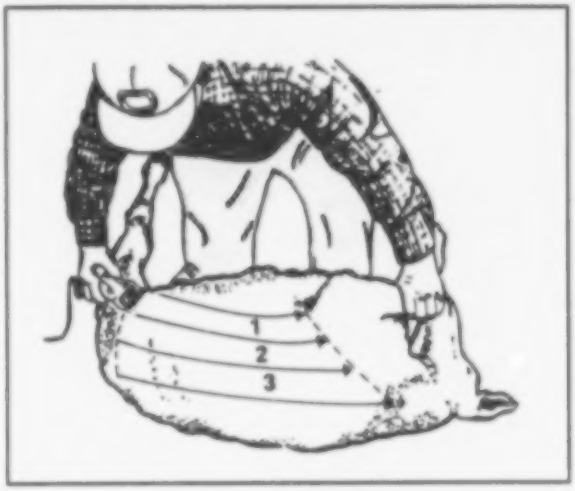


25. Hold the lamb's leg close to your body and shear down to the shoulder as shown. (Figure 14)	____	____

FIGURE 14

	Yes	No
26. Place the lamb on its back with your right foot between the hind legs and your left foot under the right shoulder. (Figure 15)	____	____
27. Continue strokes as shown. (Figure 15)	____	____

FIGURE 15



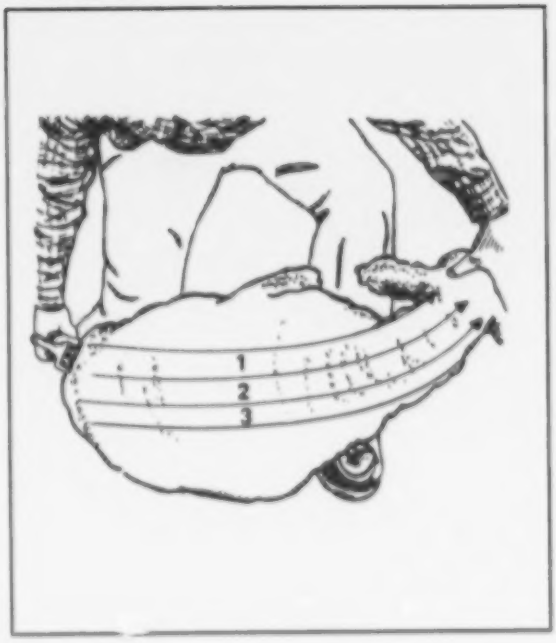
28. Force the left foreleg toward the lamb's head then stretch the skin on the side.	____	____
29. Make sure the lamb's tail is behind your right foot when you reach its backbone.	____	____

☞ **NOTE:** Your left leg should be under the lamb's shoulder and your left foot across the lamb for leverage.

30. Apply downward pressure to the lamb's head with your left hand to "roll" the lamb up.	____	____
31. Shear three strokes over the backbone to save time on the last side. (Figure 16)	____	____

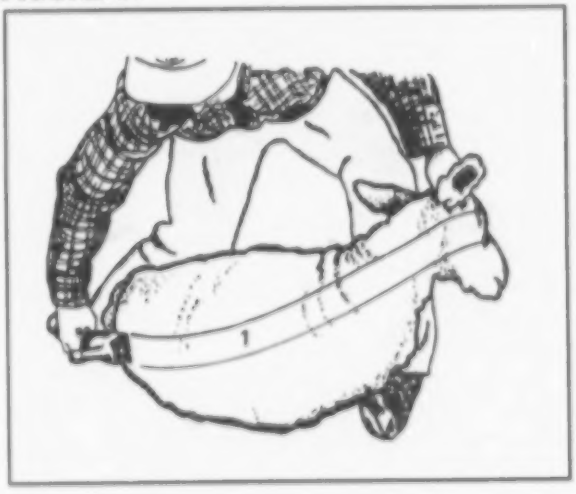
☞ **NOTE:** Avoid standing on or tearing the fleece when swinging your right leg out to shear the last side. See Figure 16.

FIGURE 16



	Yes	No
32. Hold the ear up and extend the stroke under the ear and out to the jaw with your left hand on the final stroke. (Figure 17)	____	____

FIGURE 17

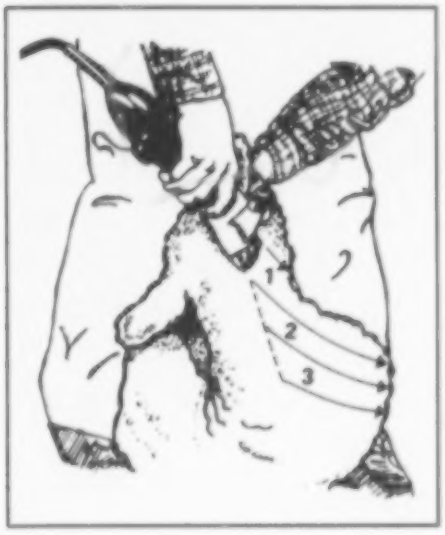


33. Clamp the lamb between your leg and hold its head with your knees.	____	____

	Yes	No
34. Use your left hand to straighten the wrinkles and clear the wool from the ear and face.	____	____
35. Shear straight down to the point of the shoulder. (Figure 18)	____	____

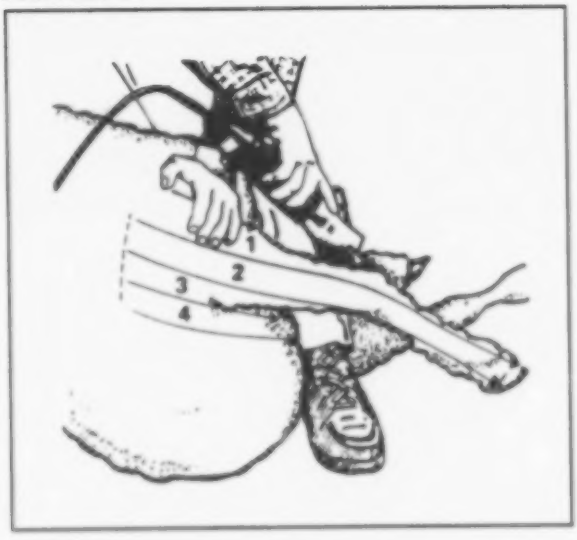
☛ **NOTE:** Allow the lamb's right foreleg to come forward after the third stroke. See Figure 18.

FIGURE 18



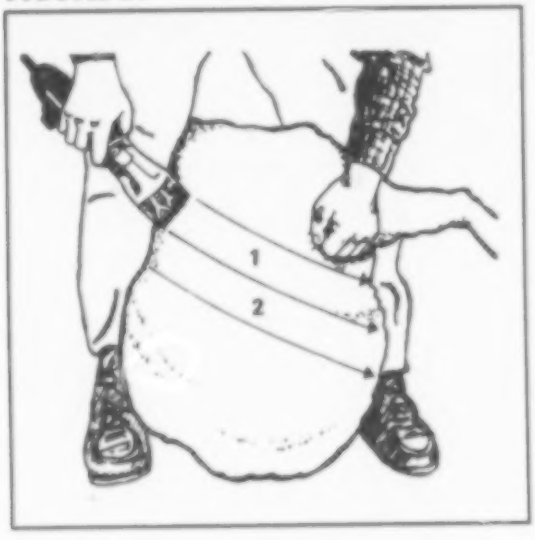
36. Push down on the point of the shoulder with the palm of your hand and pull the skin up with your finger to clean the tags under the front leg.	____	____
37. Turn the clippers under the front leg and shear to the toe. (Figure 19)	____	____

FIGURE 19



	Yes	No
38. Hold the lamb firmly between your legs with its head down on its left side to stretch the skin on the right side as the wool is taken off.	____	____
39. Move your left foot to the other side of the lamb's hind legs as you make the last stroke. (Figure 20)	____	____

FIGURE 20



40. Raise the lamb's head. (Figure 21)	____	____

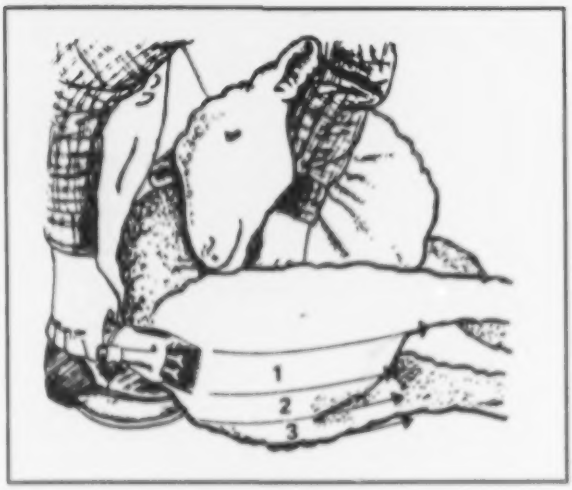
	Yes	No
41. Make the remaining strokes at the same angle to the toe, using a full comb. (Figure 21)	____	____

FIGURE 21

42. Hold the skin of the right flank in your left hand and apply pressure to the stifle joint with the lamb in position on its side. (Figure 22)	____	____

☛ **NOTE:** Slide the comb at an angle around the ham string to avoid accidentally cutting the ham string. Hold the lamb's head between your left arm and right leg, moving your left foot back so the lamb settles down on its side. Move your right foot forward to allow more reach for the last strokes. Your left foot keeps the lamb's shoulder and feet off the floor. See Figure 22.

FIGURE 22



43. Have your instructor check your work. ____ ____

44. Put the wool in the proper place. ____ ____

45. Release the lamb. ____ ____

46. Clean the work area and clean and put away the tools. ____ ____

SKILL TEST RECORD

EVALUATOR'S COMMENTS

_____

_____

_____

PRODUCT EVALUATION

Evaluator note: Rate the student on the following criteria by circling the appropriate numbers. Each criterion must receive a rating of "3" or higher to demonstrate student mastery. (See Key below.) A student who is unable to demonstrate mastery should review the material and submit another product for evaluation.

Criteria:

Observed safety precautions	4	3	2	1
Effectively sheared the lamb	4	3	2	1
Handled the animal properly	4	3	2	1

AVERAGE RATING

Evaluator note: To obtain an average rating for the Competency Profile, total the points in Product Evaluation and divide by the total number of criteria. Circle the rating on the Key.

KEY

4 **Skilled** – Can perform job with no additional training.
3 **Moderately Skilled** – Has performed job during training program; limited additional training may be required.
2 **Limited Skill** – Has performed job during training program; additional training is required to develop skill.
1 **Unskilled** – Is familiar with process, but is unable to perform job.

EVALUATOR'S COMMENTS

_____

_____

_____

1513

JOB SHEET 3	*HOOF TRIMMING, SHEARING, AND ANIMAL IDENTIFICATION*	**C-6**

Name _____

OBJECTIVE 16

Brand cattle using a hot iron.

EQUIPMENT AND SUPPLIES

- headgate and squeeze chute
- branding iron
- clippers
- branding iron heater
- leather gloves
- topical wound protectant
- animal for branding

PROCEDURE

Functional Reading
- Follow written instructions
- Interpret graphics and symbols

Job Acquisition/ Development
- Master specific job task/procedure
- Practice good work habits/attitudes

	Yes	No
1. Turn on branding iron heater according to manufacturer's instructions.	____	____
2. Restrain the animal in the chute. (Figure 1)	____	____

FIGURE 1

	Yes	No
3. Put on the leather gloves.	____	____
4. Place the iron in the fire until it reaches the color of ashes.	____	____
5. Clip the hair on the animal at the desired brand location if it is thick or dirty.	____	____
6. Place the iron on the animal's skin long enough to burn the skin to a leather color.	____	____

CAUTION: MAINTAIN A STRONG, STEADY GRIP. Failure to maintain a strong, steady grip can cause the iron to slip.

7. Apply even pressure on the branding iron and rock it back and forth to assure a burn on all parts of the brand. (Figure 2)	____	____

FIGURE 2

9. Have your instructor check your work.	____	____
10. Release the animal from the restraint.	____	____
11. Clean the work area and clean and put away the tools.	____	____

SKILL TEST RECORD

EVALUATOR'S COMMENTS

_____

_____

_____

PRODUCT EVALUATION

Evaluator note: Rate the student on the following criteria by circling the appropriate numbers. Each criterion must receive a rating of "3" or higher to demonstrate student mastery. (See Key below.) A student who is unable to demonstrate mastery should review the material and submit another product for evaluation.

Criteria:				
Observed safety precautions	4	3	2	1
Effectively branded animal	4	3	2	1
Handled animal properly	4	3	2	1

AVERAGE RATING

Evaluator note: To obtain an average rating for the Competency Profile, total the points in Product Evaluation and divide by the total number of criteria. Circle the rating on the Key.

KEY

4 **Skilled** – Can perform job with no additional training.
3 **Moderately Skilled** – Has performed job during training program; limited additional training may be required.
2 **Limited Skill** – Has performed job during training program; additional training is required to develop skill.
1 **Unskilled** – Is familiar with process, but is unable to perform job.

EVALUATOR'S COMMENTS

_____

_____

_____

JOB SHEET 4	HOOF TRIMMING, SHEARING, AND ANIMAL IDENTIFICATION	C-6

Name _____ _____

OBJECTIVE 17

Tattoo a calf.

EQUIPMENT AND SUPPLIES

- headgate and squeeze chute
- tattooing pliers
- tattoo ink
- alcohol
- clean rags
- three or four sets of digits
- piece of cardboard
- calf

PROCEDURE

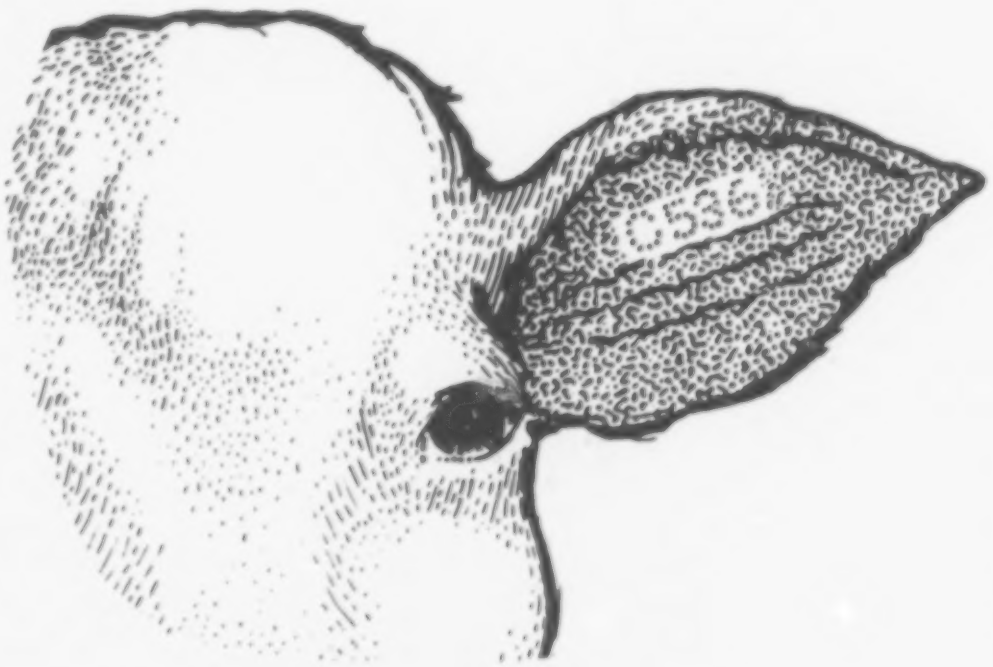
Functional Reading
- Follow written instructions
- Interpret graphics and symbols

Job Acquisition/ Development
- Master specific job task/procedure
- Practice good work habits/attitudes

	Yes	No
1. Restrain the animal in a headgate and squeeze chute.	____	____
2. Select a site free of pigment (skin color) between the cords or ribs and near the base of the ear. (Figure 1, next page)	____	____
3. Clean the tattoo site using alcohol and a clean rag.	____	____
4. Clamp the tattoo pliers on a piece of cardboard to be sure that the figures or letters are in order and are right side up.	____	____
5. Clamp the tattoo pliers quickly and firmly into the tattoo area of the ear.	____	____
6. Rub the tattoo ink thoroughly into each separate puncture hole with your thumb.	____	____

☞ **NOTE:** The secret of tattooing is to get the ink in below the surface so that the skin will heal over it. If there is an excessive flow of blood, you will have to use more ink and rub longer.

FIGURE 1



	Yes	No
7. Examine the tattoo.	____	____
8. Have your instructor check your work.	____	____
9. Release the animal from the restraint.	____	____
10. Clean the area; clean your tools and put them away.	____	____

SKILL TEST RECORD

EVALUATOR'S COMMENTS

_____

_____

_____

PRODUCT EVALUATION

Evaluator note: Rate the student on the following criteria by circling the appropriate numbers. Each criterion must receive a rating of "3" or higher to demonstrate student mastery. (See Key below.) A student who is unable to demonstrate mastery should review the material and submit another product for evaluation.

Criteria:

Observed safety precautions	4	3	2	1
Effectively tattooed the animal	4	3	2	1
Handled the animal properly	4	3	2	1

AVERAGE RATING

Evaluator note: To obtain an average rating for the Competency Profile, total the points in Product Evaluation and divide by the total number of criteria. Circle the rating on the Key.

KEY

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3 **Moderately Skilled** – Has performed job during training program; limited additional training may be required.
2 **Limited Skill** – Has performed job during training program; additional training is required to develop skill.
1 **Unskilled** – Is familiar with process, but is unable to perform job.

EVALUATOR'S COMMENTS

JOB SHEET 5	HOOF TRIMMING, SHEARING, AND ANIMAL IDENTIFICATION	C-6

Name _____

OBJECTIVE 18

Nose print cattle.

EQUIPMENT AND SUPPLIES

- ink pad and ink
- note card, 3 x 5 inches
- terry cloth towel
- headgate
- animal for nose printing

PROCEDURE

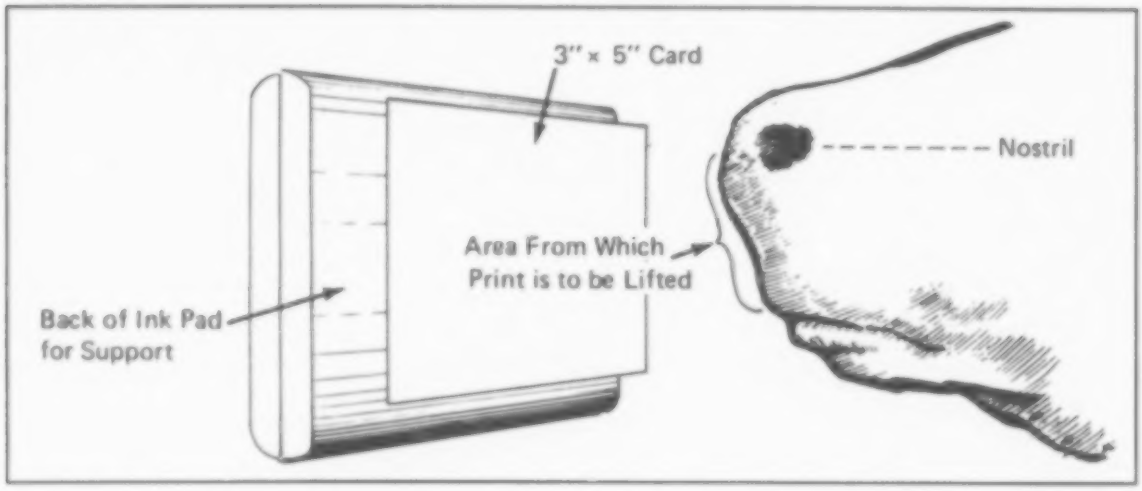
Functional Reading
- Follow written instructions
- Interpret graphics and symbols

Job Acquisition/ Development
- Master specific job task/procedure
- Practice good work habits/attitudes

	Yes	No
1. Place the animal in the headgate.	____	____
2. Stand to the right of the animal's head and reach over with your left arm to hold the head still.	____	____
☛ **NOTE:** If you are left-handed, hold the animal's head with your right arm.		
3. Dry the moisture from the nostril area with the terry cloth towel.	____	____
☛ **NOTE:** The following steps must be done quickly or the nose will get wet again and make a poor print.		
4. Load the ink pad with ink.	____	____
5. Press the ink pad against the nose, covering the hairless area with ink.	____	____
6. Place the 3 x 5 inch note card on the back of the ink pad so you have a firm surface to press against the animal's nose. (Figure 1)	____	____

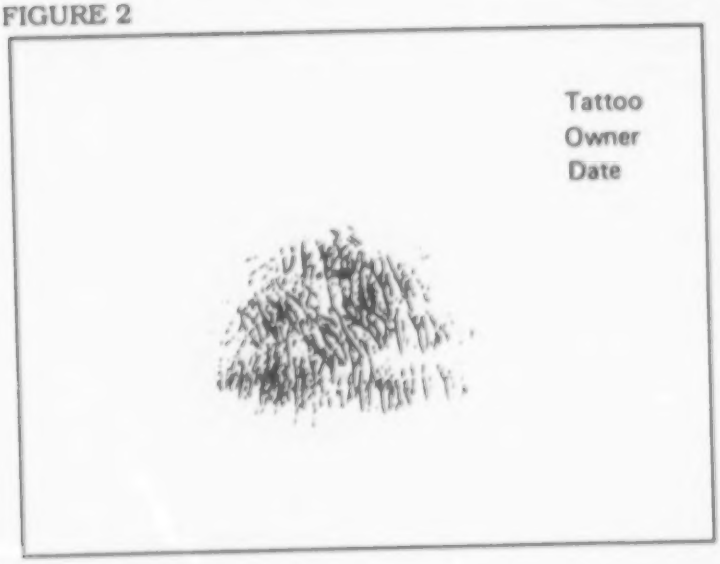
	Yes	No
7. Press the note card against the nose and hold it steady for a moment to lift a print. (Figure 1)	____	____

FIGURE 1



8. Examine the noseprint for smears due to moving the card or to moisture on the nose.	____	____
9. Repeat the print, if needed.	____	____
10. Label the printed card with the tattoo of the animal, the name of the owner, and the date the tattoo was made. (Figure 2)	____	____

FIGURE 2



	Yes	No
11. Have your instructor check your work.	____	____
12. Release the animal.	____	____
13. Clean the area and put away the tools.	____	____

SKILL TEST RECORD

EVALUATOR'S COMMENTS

_____

_____

_____

PRODUCT EVALUATION

Evaluator note: Rate the student on the following criteria by circling the appropriate numbers. Each criterion must receive a rating of "3" or higher to demonstrate student mastery. (See Key below.) A student who is unable to demonstrate mastery should review the material and submit another product for evaluation.

Criteria:				
Observed safety precautions	4	3	2	1
Effectively noseprinted cattle	4	3	2	1
Handled animal properly	4	3	2	1

AVERAGE RATING

Evaluator note: To obtain an average rating for the Competency Profile, total the points in Product Evaluation and divide by the total number of criteria. Circle the rating on the Key.

KEY

4 **Skilled** – Can perform job with no additional training.
3 **Moderately Skilled** – Has performed job during training program; limited additional training may be required.
2 **Limited Skill** – Has performed job during training program; additional training is required to develop skill.
1 **Unskilled** – Is familiar with process, but is unable to perform job.

EVALUATOR'S COMMENTS

_____

_____

_____

JOB SHEET 6	HOOF TRIMMING, SHEARING, AND ANIMAL IDENTIFICATION	C-6

Name _____

OBJECTIVE 21

Ear notch a pig.

EQUIPMENT AND SUPPLIES

- ear notcher
- baby pig ear notcher (if appropriate)
- pig
- information: litter number and pig number

PROCEDURE

Functional Reading
- Follow written instructions
- Interpret graphics and symbols

Job Acquisition/ Development
- Master specific job task/procedure
- Practice good work habits/attitudes

	Yes	No
1. Hold the pig in a restraining hold appropriate for its size and age.	____	____
2. Hold the ear notchers in your other hand.	____	____
3. Position the notchers at the appropriate ear location.	____	____
4. Squeeze the notchers firmly, until the notch is complete.	____	____
5. Remove the notchers.	____	____
6. Have your instructor check your work.	____	____
7. Release the pig.	____	____
8. Clean the area and put the tools away.	____	____

SKILL TEST RECORD

EVALUATOR'S COMMENTS

_____

_____

_____

PRODUCT EVALUATION

Evaluator note: Rate the student on the following criteria by circling the appropriate numbers. Each criterion must receive a rating of "3" or higher to demonstrate student mastery. (See Key below.) A student who is unable to demonstrate mastery should review the material and submit another product for evaluation.

Criteria:

Observed safety practices	4	3	2	1
Efficiently notched pig	4	3	2	1
Handled animal properly	4	3	2	1

AVERAGE RATING

Evaluator note: To obtain an average rating for the Competency Profile, total the points in Product Evaluation and divide by the total number of criteria. Circle the rating on the Key.

KEY

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3 **Moderately Skilled** – Has performed job during training program; limited additional training may be required.
2 **Limited Skill** – Has performed job during training program; additional training is required to develop skill.
1 **Unskilled** – Is familiar with process, but is unable to perform job.

EVALUATOR'S COMMENTS

_____

_____

_____

JOB SHEET 7	HOOF TRIMMING, SHEARING, AND ANIMAL IDENTIFICATION	C-6

Name _____

OBJECTIVE 23

Tag a sheep.

EQUIPMENT AND SUPPLIES

- ear tag
- appropriate ear tagging tool
- hole punch (if self-piercing tag is not used)
- animal for tagging

PROCEDURE

Functional Reading
- Follow written instructions
- Interpret graphics and symbols

Job Acquisition/ Development
- Master specific job task/procedure
- Practice good work habits/attitudes

	Yes	No
1. Restrain the animal.	____	____
2. Straddle the animal's back, facing its head.	____	____
If a self-piercing tag is used:		
1. Put the tag into the appropriate tool.	____	____
2. Position the ear between the point of the tag and the face of the tool.	____	____
3. Squeeze the tool, as you would a pair of pliers until the ear is pierced and the tag is snapped.	____	____
4. Go to Step 7.	____	____
If the tag is not self-piercing		
1. Position the animal's ear in the hole punch.	____	____
2. Squeeze the tool, as you would a pair of pliers until the ear is pierced.	____	____
3. Remove the tool.	____	____
4. Spread the tag open and insert one end into the hole.	____	____

	Yes	No
☞ **NOTE:** Make sure the tag number is on the upper part of the ear.		
5. Rotate the tag through the ear.	____	____
6. Snap the tag closed.	____	____
7. Have your instructor check your work.	____	____
8. Release the animal.	____	____
9. Clean the area and put the tools away.	____	____

SKILL TEST RECORD

EVALUATOR'S COMMENTS

_____

_____

_____

PRODUCT EVALUATION

Evaluator note: Rate the student on the following criteria by circling the appropriate numbers. Each criterion must receive a rating of "3" or higher to demonstrate student mastery. (See Key below.) A student who is unable to demonstrate mastery should review the material and submit another product for evaluation.

Criteria:

Observed safety procedures	4	3	2	1
Efficiently tagged the animal	4	3	2	1
Handled the animal appropriately	4	3	2	1

AVERAGE RATING

Evaluator note: To obtain an average rating for the Competency Profile, total the points in Product Evaluation and divide by the total number of criteria. Circle the rating on the Key.

KEY

4 **Skilled** – Can perform job with no additional training.
3 **Moderately Skilled** – Has performed job during training program; limited additional training may be required.
2 **Limited Skill** – Has performed job during training program; additional training is required to develop skill.
1 **Unskilled** – Is familiar with process, but is unable to perform job.

EVALUATOR'S COMMENTS

_____

_____

_____

Animal Science

Student Workbook

Part 3

Developed by the
Curriculum and Instructional Materials Center
for the Division of Agricultural Education
Oklahoma Department of Vocational and Technical Education

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OBJECTIVE SHEET

MARKETING LIVESTOCK AND MARKET AGENCIES

D-1

INTRODUCTION

Marketing livestock is an important aspect of the livestock industry. Marketing allows livestock products to be moved from the producer to the consumer. Livestock can be marketed in a variety of ways such as auction or direct selling. In order to be successful, livestock producers must understand the various aspects of marketing livestock.

PREREQUISITE

None

FOCUS ASSIGNMENTS

Reading Comprehension
- Gain factual information
- Analyze cause and effect
- Draw conclusions

Language
- Use standard grammar, spelling, and capitalization
- State ideas clearly

Composition
- Use complete sentences

FOCUS ASSIGNMENTS	
PREREADING:	Read OSU Extension Facts No. 521 "Cattle Marketing Plan" by Derrell Peel and Kim Anderson.
WRITING:	Write a short (one paragraph) discussion on cattle marketing plans and why they are important to the livestock producer.

UNIT OBJECTIVE

After completing this unit, you will show the following competencies by mastering the activities on the Assignment Sheets and by scoring at least 85% on the Written Test.

SPECIFIC OBJECTIVES

1. Choose the word or phrase to complete statements about marketing livestock.
2. Discuss types of marketing.
3. Analyze market information from a local livestock auction and from a terminal market. (Assignment Sheet 1)
4. Interpret livestock reports. (Assignment Sheet 2)
5. State characteristics of the Packers and Stockyards Act.
6. Select from a list types of charges and selling fees involved in livestock auctions.
7. State factors that determine dressing percentage of cattle.
8. Select from a list factors which affect quality grade.
9. State factors on which yield grades are based.
10. Discuss shrinkage.
11. Select from a list major causes of livestock bruises.
12. Calculate break-even price. (Assignment Sheet 3)
13. Calculate selling prices of livestock when given the kind of livestock, number, price per hundredweight, and the shrinkage, if any. (Assignment Sheet 4)
14. Calculate selling prices of hogs and cattle according to yield and grade. (Assignment Sheet 5)
15. Discuss marketing of purebred cattle.
16. Locate sources for purebred ads. (Assignment Sheet 6)
17. Design an ad. (Assignment Sheet 7)

INFORMATION SHEET	*MARKETING LIVESTOCK AND MARKET AGENCIES*	**D-1**

OBJECTIVE 1

Optional Activities/ Resources
- Discussion
- Write a paper
- Read trade journals

Choose the word or phrase to complete statements about marketing livestock.

- The marketing of livestock is a system that involves many individuals and businesses and includes factors such as transporting, processing, and distributing livestock and livestock products.
- The marketing system allows livestock and livestock products to be moved from the producer to the consumer.
- The livestock marketing industry is heavily regulated; many of the regulations are under the USDA.
  - The Wholesome Meat Act assures consumers of wholesome meat and meat products, sanitary processing conditions, and truthful labeling of meat and meat products.
  - The Packers and Stockyards Act regulates trade practices in the livestock marketing industry.
  - Humanitarian regulations include the Humane Slaughter Act and the 28-Hour Law.

    ☑ **NOTE:** The 28-Hour Law was passed in 1906 and required periodic stops for livestock in transit; the law applies only to rail transit. The commercial benefits of periodic stops makes it beneficial to stop no matter what the type of transit.
- Grading of meat products helps the efficiency of the marketing system. Grading is both optional and charged to the packer.
- Livestock producers must be knowledgeable about marketing if they are to be successful.
- Marketing alternatives and strategies available to the producer depend on the type of production.

  EXAMPLE: Cow-calf operations or feeder operations.

- Livestock are marketed according to *class* and *grade*.

- Producers must consider the number and type of livestock to be purchased or sold, the current market price, and transportation costs when determining how to market livestock.

- International trade has become increasingly important in marketing livestock products.

  ☑ **NOTE:** The United States is both an importer and exporter of livestock and livestock products. The United States is a major importer of low-quality beef. The United States exports by-products such as hides and skins, fats and oils, variety meats, and breeding stock.

- Livestock marketing includes two marketing systems: the cash market and the futures market.

OBJECTIVE 2

Optional Activities/ Resources
- Discussion
- Read OSU Extension Fact Sheets and Publications
- Write a report on the futures market

Discuss types of marketing.

- **Auctions** – Livestock are sold by public bidding to the buyer who offers the highest price.

  ☑ **NOTE:** Auctions may be referred to as sale barns, community sales, or community auctions.

- **Direct marketing** – Livestock are sold directly and there are generally no commission firms or brokers involved in the marketing process; livestock are often sold at the farm or ranch.

  - *Order buyers* buy cattle for cattle feeders and for packing plants.
  - *Cattle dealers* buy feeder cattle for cattle feeders and may also buy slaughter cattle.
  - *Contract sales* are a method of marketing cattle directly from feeder cattle producers to cattle feeders.
  - Farmers may sell *directly to packers* at packer buying stations or packing plants.
  - Local dealers or individuals may purchase animals on the farm from the producer.

- Farmers may sell cattle *directly to the consumer.*

  ☞ **NOTE:** The agreements between the farmer and consumer often include provisions for butchering the animal.

- **Electronic markets** – Electronic marketing involves the use of modern communications and computer technology to aid in marketing farm products.

  - Telephone auctions (teleauctions) are auctions conducted over a conference telephone network.

  - Video auctions are auction sales where buyers view video tapes of the products for sale.

  - Computerized markets use computers to disseminate information about farm products for sale; buyers have access to the descriptions through computer terminals; trading is conducted using an accepted pricing method such as auction, bids and offers, or negotiation.

  - Computer-assisted markets use a computer to list products for sale but prices are not negotiated over the computer system; buyers contact the sellers directly and negotiate the sale of the product.

- **Carcass grade and weight basis** – Marketing by carcass grade and weight allows for the high cutout value of prime cuts and the quality to be better taken into account.

- **Forward contracts** – Cash contracts between buyers and sellers for future delivery of cattle; the contract specifies the price, when the cattle will be delivered, quantity and quality of the cattle, and delivery site.

- **Retained ownership** – Retained ownership can be considered a marketing alternative.

  ☞ **NOTE:** Retained ownership may be considered when the market does not offer the price objective. The cattle are kept through the next production level. For example, cow-calf producers may decide to keep the calves through stocker and feedlot levels.

- **Terminal markets** – Livestock trading centers whose facilities are owned by a stockyard company and have commission firms (selling agents); terminal markets may use auction sales as a method of selling.

- **Futures market** – The futures market can help producers market cattle by providing information and establishing a price.
  - A futures contract is a commitment to make or take delivery of a given commodity at some time in the future.

    ☑ **NOTE:** A futures contract is similar to a forward contract except that a futures contract is sold at auction to the highest bidder and can be easily bought back; a forward contract is a private contract and may not be easily bought back.
  - Speculators trade futures contracts to make a profit.
  - Hedgers are traders who use the livestock futures market to offset price risk on their livestock.

OBJECTIVE 3

Complete Assignment Sheet 1.

OBJECTIVE 4

Complete Assignment Sheet 2.

OBJECTIVE 5

State characteristics of the Packers and Stockyards Act.

Optional Activities/ Resources in Instructor's Guide

☑ **NOTE:** The Packers and Stockyards Act was passed in 1921 to provide for ongoing regulation of livestock marketing.

- The Packers and Stockyards Act is a federal law which is administered by the USDA.

  ☑ **NOTE:** The Packers and Stockyards Act established the *Packers and Stockyards Administration* which is under the Secretary of Agriculture.
- The Packers and Stockyards Act affects all interstate transactions in livestock – cattle, sheep, hogs, horses, mules, and goats.

- The Act sets standards for fair business practices and competition.

  ☑ **NOTE:** The provisions of the Packers and Stockyards Act protect producers, consumers, and companies in the industry from unfair, deceptive, or monopolistic trade practices which may adversely affect the true market value of their products or purchases.

- The provisions of the Packers and Stockyards Act apply to stockyards, auction markets, packers, market agencies, and dealers involved in livestock marketing.

- The Act covers registration and bonding, services and rates, payment, scales and weighing, accounting, and business practices.

OBJECTIVE 6

Select from a list types of charges and selling fees involved in livestock auctions.

Optional Activities/ Resources
- Hear guest speakers
- Visit a livestock auction

WORDS YOU SHOULD KNOW	
yardage	the charge for the use of the facilities for keeping livestock

CHARGES

- Commission for selling
- Yardage
- Feed
- Services

  ☑ **NOTE:** Services may include items such as health and brand inspection, insurance, vaccination, or testing.

SELLING FEES

- Percentage of gross sales
- Per head basis

  ☑ **NOTE:** Per head basis is the most commonly used method.

OBJECTIVE 7

State factors that determine dressing percentage of cattle.

Optional Activities/ Resources
- Read information from *Meat and Poultry Processing*

WORDS YOU SHOULD KNOW	
dressing percentage (DP)	the percentage the carcass is of the live weight; (carcass weight - live weight) x 100
fill	the amount of feed and water in the animal's digestive system

- Fill

  ☑ **NOTE:** Fill can be due to feed, water, and pregnancy.

- Muscling

  ☑ **NOTE:** The more muscling, the higher the dressing percentage.

- Fat

  ☑ **NOTE:** The more fat, the higher the dressing percentage. Although excess fat can adversely affect yield, which will lower value.

OBJECTIVE 8

Select from a list factors which affect quality grade.

Optional Activities/ Resources
- Read information from *Meat and Poultry Processing*
- Watch the video *Beef Quality Grading*
- Read USDA publications

☑ **NOTE:** Consumers prefer meat that is wholesome, attractive, and flavorful. Grading standards have been established that determine which carcasses have these preferred characteristics. Some of the factors that affect the quality of meat are listed below.

- **Carcass age** – The older the animal is, the lower the quality of the meat. Older animals are tougher, their meat is darker and flavors are usually stronger.

- **Gender** – Males that are mature and not castrated have objectionable flavors. They are tougher and the meat is usually coarser in texture.

- **Amount of fat** – Fat is an important consideration in determining quality since animals with too little fat are tough and tasteless, while too much fat is wasteful.

- **Color** – Consumers show a marked preference for meat that is bright in color because they associate it with freshness. Meat that is off-color is graded down in quality.

- **Wholesomeness** – Government inspection of carcasses ensures the meat bought by the consumer is free from disease, parasites, and contamination from anything that might be considered a health hazard.

OBJECTIVE 9

State factors on which yield grades are based.

Optional Activities/ Resources
- Read information from *Meat and Poultry Processing*
- Watch the video *Beef Quality Grading*

☑ **NOTE:** Yield grades are divided into five classifications from 1 to 5 with lean carcasses classified as 1, and fat carcasses classified as 5. In determining yield grades, there are four significant factors to consider.

- Carcass weight
- Area of the rib eye muscle
- Amount of external fat
- Amount of internal or kidney, heart, and pelvic fat

OBJECTIVE 10

Discuss shrinkage.

Optional Activities/ Resources
- Read information from *Meat and Poultry Processing*

WORDS YOU SHOULD KNOW	
fillback period	the time during which the livestock are fed after they reach market
pencil shrink	subtracting an estimated amount of shrink automatically when purchasing livestock; 2-3 percent is customary
shrink	the loss of weight due to the elimination of body fluids as livestock are moved to market

- Marketing livestock often involves *stress* and *absence of water* to livestock. These factors can cause shrink, which will affect the market value of the animal.

- Factors that affect shrink include:
  - Fill

    ☛ **NOTE:** Animals on high moisture feed such as green pasture, silage, or grain ration will be subject to greater shrink.
  - Handling
  - Weather
  - Distance transported

    ☛ **NOTE:** Much of the weight loss occurs in the first two hours of transit. However, shrinkage increases as the hours in transit increase.
  - Species and class
  - Condition of the livestock
  - Sex
  - Length of the fillback period
- A major means of minimizing shrink is to reduce the distance the livestock are transported.
- *Tissue shrinkage* is the actual loss of carcass weight. Some tissue shrinkage may occur as animals are transported.

OBJECTIVE 11

Optional Activities/ Resources in Instructor's Guide

Select from a list major causes of livestock bruises.

☛ **NOTE:** Many bruises cannot be detected until after slaughter unless there are cuts or bumps present on the animal. Slaughter buyers must take possible losses due to bruising into consideration since bruises often cause a portion of the meat to be unfit for consumer sale.

- Failure to properly partition livestock by different kinds and class when in transit
- Horned cattle

- Overloading or underloading

  ☑ **NOTE:** Overloading or underloading can cause crowding and bumping.

- Projections from objects

- Rough and careless handling

  ☑ **NOTE:** This includes such items as excessive use of canes, whips, or clubs on livestock. Rough and careless handling may also cause livestock to crowd and bump.

OBJECTIVE 12 **Complete Assignment Sheet 3.**

OBJECTIVE 13 **Complete Assignment Sheet 4.**

OBJECTIVE 14 **Complete Assignment Sheet 5.**

OBJECTIVE 15 **Discuss marketing of purebred cattle.**

Optional Activities/ Resources
- List differences between crossbred and purebred marketing
- Read breed association magazines
- Hear guest speakers

- The marketing of purebred cattle is a specialized business.
  - Purebred cattle are usually sold by private sales or by auction.
  - Purebred associations may sponsor consignment sales where purebred cattle are auctioned.
  - Purebred breeders advertise in breed association magazines and other sources and by exhibiting at fairs and shows.

  ☑ **NOTE:** Purebred cattle which are culled may be sold through other market channels.

OBJECTIVE 16 **Complete Assignment Sheet 6.**

OBJECTIVE 17 **Complete Assignment Sheet 7.**

ASSIGNMENT SHEET 1	*MARKETING LIVESTOCK AND MARKET AGENCIES*	**D-1**

Name _____ Score _____

OBJECTIVE 3

Analyze market information from a local livestock auction and from a terminal market.

EQUIPMENT AND SUPPLIES

- Market information from a local auction market
- Market information from a terminal market

INSTRUCTIONS

Analyze the market information by answering the following questions.

Reading Comprehension
- Gain factual information
- Draw conclusions

Functional Reading
- Use content area vocabulary

1. What are the names and locations of the auction market and terminal market?

_____

_____

2. What classes of livestock were sold?

_____

_____

_____

_____

Language
- Use standard grammar, spelling, and capitalization
- State ideas clearly

Composition
- Use complete sentences

3. What prices did the livestock bring?

_____

_____

_____

_____

4. Does the information indicate whether the prices were higher or lower than recent prices?

_____

5. Does the market information from the terminal marke report futures prices?

_____

6. What other information do the reports give?

_____

_____

_____

_____

7. How might producers use the market information?

_____

_____

_____

_____

ASSIGNMENT SHEET 2	*MARKETING LIVESTOCK AND MARKET AGENCIES*	**D-1**

Name _____ Score _____

OBJECTIVE 4

Interpret livestock reports.

EQUIPMENT AND SUPPLIES

- USDA reports or other livestock reports

INTRODUCTION

Livestock reports can help producers make management decisions and are available from several different sources. The USDA periodically releases supply and demand reports for livestock. Three reports that are important to livestock producers are the Cattle on Feed Report, Hog and Pig Report, and the Cattle Inventory Report. The National Cattleman's Association operates a cattle marketing service, through Cattle Marketing Information Service, Inc., referred to as Cattle-Fax. Market information is also provided by farm and trade magazines, market agencies, and producer organizations.

INSTRUCTIONS

Interpret one report by answering the following questions.

Reading Comprehension
- Gain factual information
- Draw conclusions

Functional Reading
- Use content area vocabulary

Language
- Use standard grammar, spelling, and capitalization
- State ideas clearly

Composition
- Use complete sentences

1. Name of the report

   _____

2. What information does the report give?

   _____

   _____

   _____

   _____

   _____

   _____

3. How might a producer use this information?

ASSIGNMENT SHEET 3	*MARKETING LIVESTOCK AND MARKET AGENCIES*	**D-1**

Name _____ Score _____

OBJECTIVE 12

Calculate break-even price.

INTRODUCTION

Break-even price is calculated by adding the carcass value and drop credit then dividing by the live weight times 100. Drop credit is the value of the hide and the offal in relation to the slaughter costs. Offal is the internal organs including the heart, digestive, reproductive, and respiratory systems. Break-even price can be calculated using the following formula:

Break-even price = (Carcass value + Drop Credit) ÷ Live weight x 100

EXAMPLE: 240 lb. U.S. No. 1 Market Barrow
72 percent Dressing Percent (DP)
$.85/lb. Carcass price
$20.00 Drop Credit

240 x .72 = 173 lbs Carcass weight (172.80 rounded up to 173)
173 x .85 = $147.05 Carcass value
$147.05 + $20.00 = $167.05
(167.05 ÷ 240) x 100 = $70.00/cwt Break-even price

INSTRUCTIONS

Answer the questions below.

Math Application
- Select/apply mathematical formula

Functional Math
- Solve practical problems

1. What would be the break-even price of a 260 lb. US No. 2 market barrow with a 70 percent DP if carcass price is $.82/lb and drop credit is $22.00?

2. What would be the break-even price of a 1250 lb fat steer with a DP of 62 percent if carcass price is $1.22/lb and a drop credit of $66.00?

3. What would be the break-even price of a 120 lb slaughter lamb with a DP of 54 percent if carcass price is $1.55/lb and a drop credit of $16.00?

4. If you had a carcass of a 240 lb US No. 1 hog with a 72 percent DP, a $23.00 drop credit, and a live weight price of $.45/lb., what would be the least you could accept for the carcass?

ASSIGNMENT SHEET 4	*MARKETING LIVESTOCK AND MARKET AGENCIES*	**D-1**

Name _____ Score _____

OBJECTIVE 13

Calculate selling prices of livestock when given the kind of livestock, number, price per hundredweight, and the shrinkage, if any.

☛ **NOTE:** Current prices may be higher or lower than the examples given below.

INSTRUCTIONS

Calculate the selling prices of the livestock given below.

Operation and Calculation
- Calculate with decimals

Math Application
- Solve word problems
- Solve percent problems

Functional Math
- Solve practical problems
- Solve income/expense problems

1. Suppose you sold 20 head of Angus steers direct to a feeder to be delivered at the local livestock auction for weighing. You agreed on a price of $94.50 per hundredweight and gave a 3% shrinkage. The calves averaged 575 lbs. What would be the total dollars received for the steers?

2. You sold seven Hereford slaughter steers to a terminal market. The steers averaged 1200 lbs. each and brought $75.00 per hundredweight. How much money did you receive for the steers?

3. You sold five Hereford heifers for $82.00 per hundredweight, and they averaged 560 lbs. What was the amount of money you received?

4. Suppose you had the option to sell 150 head of steers either at the local livestock auction or at a terminal market which is 100 miles from your farm. According to the information at the terminal market, steers similar to yours are bringing 92.50 per hundredweight. You estimated that the steers would weigh 575 lbs. on the average. Last week's local livestock auction was 75 cents lower than the terminal market. Using an estimated shrinkage of 4% on hauling to the terminal market and selling for 92.50 per hundredweight, would it be more profitable to sell at the livestock auction or at the terminal market? Why?

ASSIGNMENT SHEET 5	*MARKETING LIVESTOCK AND MARKET AGENCIES*	**D-1**

Name _____ Score _____

OBJECTIVE 14

Calculate selling prices of hogs and cattle according to yield and grade.

INSTRUCTIONS

Operation and Calculation
- Calculate with decimals

Math Application
- Solve word problems
- Solve percent problems

Functional Math
- Solve practical problems
- Solve income/expense problems

Calculate the price of the hogs and cattle below.

1. You sold five market hogs which graded U.S. No. 1. The hogs averaged 215 lbs live weight, and the carcass averaged 148 lbs. What was the percent yield?

2. You sold two Angus steers using a yield grade of $1.15 cents per pound. The steers average live weight was 950 lbs., and the average carcass weight was 500 lbs. What was the value of the steers?

3. You sold 20 Hereford steers which averaged 750 lbs live weight and hung up a 400 lb carcass. Using a yield grade factor of $1.12 cents per pound, what would be the value of the steers?

   Using a price of $80.50 per hundredweight, what would be the value of the steers?

ASSIGNMENT SHEET 6

MARKETING LIVESTOCK AND MARKET AGENCIES

D-1

Name _____ Score _____

OBJECTIVE 16

Locate sources for purebred ads.

EQUIPMENT AND SUPPLIES

- Breed association magazines
- Newspapers
- Sales catalogs

INSTRUCTIONS

Research and Reference
• Locate resources

Using breed association magazines, newspapers, sales catalogs, or other sources locate two specific sources for purebred ads. Answer the questions below.

1. Name of the two sources

_____

_____

2. Breeds that are being advertised.

_____

_____

ASSIGNMENT SHEET 7	*MARKETING LIVESTOCK AND MARKET AGENCIES*	**D-1**

Name _____ Score _____

OBJECTIVE 17

Design an ad.

EQUIPMENT AND SUPPLIES

- White or colored paper
- Colored pens or markers
- Ruler

INSTRUCTIONS

Functional Reading
- Follow written instructions

Language
- Use standard grammar, spelling, and capitalization
- State ideas clearly

Composition
- Construct graphics and symbols

Cognitive Activities
- Create a finished product

Choose a purebred cattle breed and create an advertisement to promote a hypothetical operation of that breed. Following are some guidelines for creating the ad:

- Use correct spelling, grammar, and punctuation.
- Include open space so that the ad is easy to read.
- Use artwork to catch the reader's eye.
- Make sure that the ad conveys an accurate message to the reader.
- The goals of an ad include: attract the attention of the reader, inform them about the product, tell them why they should purchase the product.
- Present the strong points of the operation in the ad.
- Be sure to list important information that the reader needs to know such as the name and location of the business; you may also want to include a phone number and operating hours.

OBJECTIVE SHEET

MARKET GRADES AND CLASSES OF LIVESTOCK

D-2

INTRODUCTION

Congratulations! You're going to buy a diamond ring and propose marriage to the partner of your dreams. You go to a jewelry store where ten diamonds are placed in front of you. The clerk smiles and says, "You can have any of these for $1,500." You pick up the biggest, then the smallest, and then start to sweat. You realize that you know absolutely nothing about diamonds. To be an educated consumer (or producer) you must have more information to determine their value.

The same is true with livestock. This unit provides the information you need to make educated buying and selling decisions about market grades and classes of livestock.

PREREQUISITE

None

FOCUS ASSIGNMENTS

Reading Comprehension
- Gain factual information
- Analyze cause and effect
- Draw conclusions

Language
- Use standard grammar, spelling, and capitalization
- State ideas clearly

Composition
- Use complete sentences

FOCUS ASSIGNMENTS	
PREREADING:	Read *Meat Inspection and Grading*, by Frederick K. Ray, OSU Extension Facts No. 3972.
WRITING:	Write a short essay (one paragraph to one page) on the differences between meat inspection and meat grading.

UNIT OBJECTIVE

After completing this unit, you will show the following competencies by mastering the activities on the Assignment and Job Sheets and by scoring at least 85% on the Written Test.

1. Choose the word or phrase to complete statements about market grades and classes of livestock.

2. List factors that should be considered in selecting feeder cattle.

3. Define approximate age ranges for cattle.

4. State indicators of yield grades.

5. Choose the word or phrase to complete statements about factors and standards used in the preliminary yield grade schedule for cattle.

6. Calculate yield grades for cattle carcasses. (Assignment Sheet 1)

7. Name qualifications for quality grades of cattle.

8. Match slaughter grades of cattle to their descriptions.

9. Select true statements about the qualifications for feeder grades of cattle.

10. Classify live cattle according to slaughter and feeder grades. (Assignment Sheet 2)

11. List factors that determine market classes of sheep.

12. Match characteristics of age groups of sheep to their descriptions.

13. Name the criteria for slaughter grades of lamb.

14. Match slaughter grades of lamb to their descriptions.

15. List qualifications for market grades of swine.

16. Name the criteria for slaughter grades of swine.

17. Match the slaughter grades of swine to their descriptions.

18. Match feeder grades of swine to their descriptions.

19. Classify swine according to slaughter grades. (Assignment Sheet 3)

20. Name market classes, criteria, and grades of poultry.

21. Name grades, criteria, and classes of eggs.

22. Discuss marketing eggs.

INFORMATION SHEET

MARKET GRADES AND CLASSES OF LIVESTOCK

D-2

OBJECTIVE 1

Optional Activities/Resources
- Video
- Visit a stockyard and identify different market grades and classes of livestock.

Choose the word or phrase to complete statements about market grades and classes of livestock.

WORDS YOU SHOULD KNOW	
grade	classification by standards of size, quality, uniformity, trueness to type, freedom from disease and undesirable marks or blemishes, etc.
hog	a swine weighing more than 120 pounds
finishing	fattening an animal prior to slaughter
freshen	to come into milk, as when a dairy cow has a calf
pig	a swine weighing less than 120 pounds

- The USDA (United States Department of Agriculture) has established standards to grade and class cattle, sheep, swine, and poultry. The grades and classes give us a common language to discuss the relative quality of livestock. The different grades and classes enable consumers and producers to evaluate the differences between animals. The value of livestock is determined by the grade and class. As a consumer, you pay more for a Prime steak than a Choice steak. As a producer you expect to be paid more for a carcass that produces Prime cuts. USDA standards include:

Market class

- Market class refers to the grouping of livestock according to the purpose for which an animal is to be used
- **Market classes of cattle:**
  - **slaughter** – an animal that is intended for immediate slaughter or that is more suitable for slaughter than for any other purpose
  - **feeder** – an animal that is intended for intensive feeding in preparation for slaughter

- **milker or springer** – a cow recently freshened or soon due to calve, which is sold for milking purposes
- **slaughter calf** – a calf between the ages of three months and one year which usually receives grain in addition to milk and is fat enough to slaughter
- **feeder calf** – a calf of weaning age that is sold for further growing or finishing
- **vealer** – a calf under three months of age that is fattened and slaughtered

- **Market classes of sheep:**
  - **slaughter** – a yearling or older animal intended for immediate slaughter
  - **feeder** – a yearling or older animal best suited for further finishing
  - **breeder** – a ewe that is used for breeding
  - **slaughter lamb** – a young lamb under one year of age that is fat enough for immediate slaughter
  - **feeder lamb** – a young lamb under one year of age that carries sufficient finish for slaughter purposes, but which shows indications of making good gains if placed on feed
  - **shearer** – a lamb intended for shearing and further finishing prior to slaughter

- **Market classes of swine:**
  - **slaughter hog** – a hog that is fat enoug for immediate slaughter
  - **feeder hog** – a hog that will be fed to gain additional weight prior to slaughter
  - **slaughter pig** – a pig that is fat enough for immediate slaughter
  - **feeder pig** – a pig that will be fed to gain additional weight prior to slaughter

Market grade

- Market grade refers to the relative degree of excellence within a class; composed of yield grades and quality grades
  - **quality grades** – gage differences in palatability (flavor and tenderness) (Table 1)

    ☞ **NOTE:** Quality grades are discussed in objective 7.

TABLE 1

Quality Grades of Meats			
Beef	**Sheep**	**Swine**	**Poultry**
Prime	Prime	U.S. No. 1	Grade A
Choice	Choice	U.S. No. 2	Grade B
Select	Good	U.S. No. 3	Grade C
Standard	Utility	U.S. No. 4	
Commercial	Cull*	U.S. Utility	
Utility			
Cutter			
Canner			

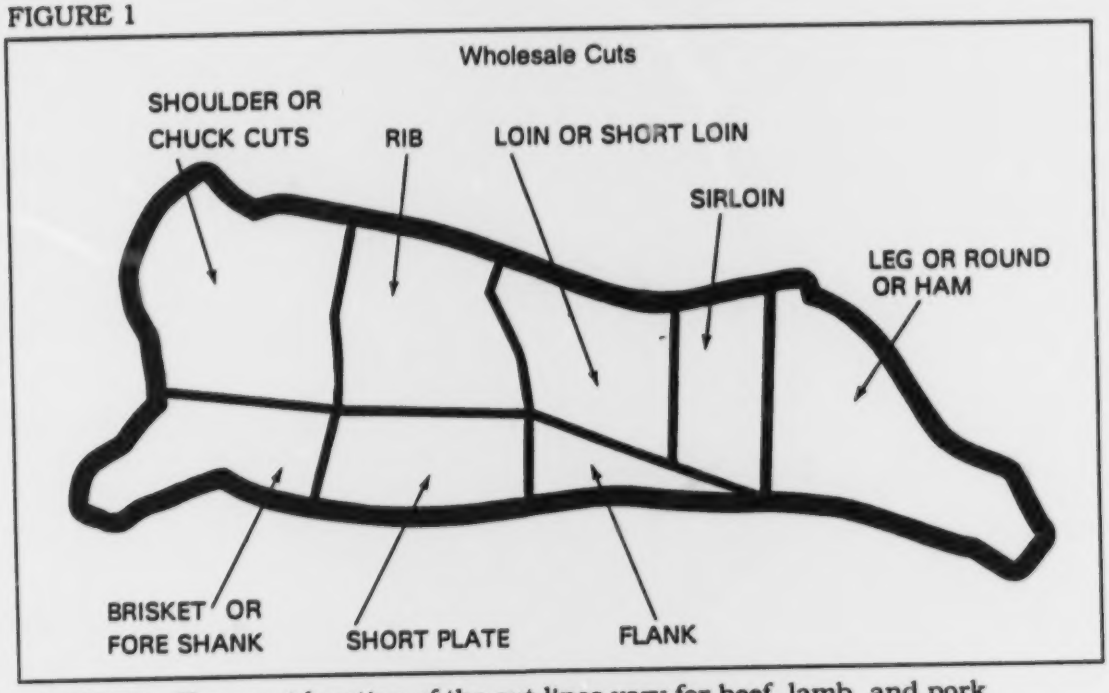
* limited to mutton carcasses

  - **yield grades** – identify the percentage of lean meat that can be obtained from the carcass (Figure 1).

    ☞ **NOTE:** Yield grades are discussed in objective 4.

    - Yield grades for beef and sheep are 1, 2, 3, 4, and 5.
    - Yield grades for swine are 1, 2, 3, 4, and Utility.

FIGURE 1



☞ **NOTE:** The exact location of the cut lines vary for beef, lamb, and pork carcasses, but they are generally broken in the manner shown in Figure 1.

OBJECTIVE 2

Optional Activities/Resources
- Talk with a stock manager about factors he or she uses when selecting feeder cattle.

List factors that should be considered in selecting feeder cattle.

WORDS YOU SHOULD KNOW	
feeder animal	animal that is intended for intensive feeding in preparation for slaughter
thrift	an animal that is growing vigorously, thriving

Factors to consider when selecting feeder cattle

- use
- sex (steer, bull, stag, heifer, cow)
- age

  ☞ **NOTE:** Age is discussed in objective 3.

- thrift

- natural fleshing
- breeding
- uniformity
- absence of horns
- temperament and disposition

OBJECTIVE 3

Define approximate age ranges for cattle.

Optional Activities/Resources
- Identify age categories in a herd.

- **vealers** – cattle under three months of age
- **calves** – cattle between the vealer and yearling stage
- **yearlings** – cattle between 12 and 24 months of age
- **two-year-olds** – cattle from 24 months to 36 months of age
- **older cattle** – cattle over 36 months of age

OBJECTIVE 4

State indicators of yield grades.

Optional Activities/Resources
- Instructor points out the indicators of yield grades on a live animal.

- amount of external fat
- size of rib eye muscle
- quantity of kidney, pelvic, and heart fat
- carcass weight (warm)

OBJECTIVE 5

Choose the word or phrase to complete statements about factors and standards used in the preliminary yield grade schedule for cattle.

Required Activities/Resources
- Review yield grade calculation.

Optional Activities/Resources
- Video
- Talk with a USDA extension about determining yield grade.
- Visit a meat packing facility to determine yields and retail cuts on beef carcasses.

WORDS YOU SHOULD KNOW	
cod	the region where the male reproductive organs are located
cutability	the percent of boneless, trimmed retail cuts from the round, loin, rib, and chuck in the carcass

- **yield grade levels** – The yield grade level corresponds with the cutability of the carcass: the lower the yield grade, the higher the cutability. (Table 2)

TABLE 2

Yield Grade	Cutability (%)
1	52.4 and above
2	50.1 - 52.3
3	47.8 - 50.0
4	45.5 - 47.7
5	45.4 and below

  - **yield grade 1** – Yield grade 1 slaughter cattle produce carcasses with very high yields of boneless retail cuts. Very thickly muscled cattle, typical of the minimum of this grade, have a high proportion of lean to bone. They are moderately wide and the width through the shoulders and rounds is greater than through the back. The top is well rounded with no evidence of flatness, and the back and loin are thick and full. The rounds are deep, thick, and full and the width through the middle part of the rounds is greater than through the back. The shoulders are slightly prominent and the forearms are thick and full. These cattle have only a thin covering of fat over the back and rump. The flanks are shallow and the brisket and cod or udder have little evidence of fullness.

  - **yield grade 2** – Yield grade 2 slaughter cattle produce carcasses with high yields of boneless retail cuts. Very thickly muscled cattle, typical of the minimum of this grade, have a high proportion of lean to bone. They are wide through the back and loin and have slightly greater width through the shoulder and rounds than through the back. The top is well-rounded with little evidence of flatness and the back and loin are thick and full. The rounds are thick, full, and deep and the thickness through the middle part of the rounds is greater than that over the top. The shoulders are slightly prominent and the forearms are thick and full. There is a slightly thick covering of fat over the back and rump and the flanks are slightly deep.

- **yield grade 3** – Yield grade 3 slaughter cattle produce carcasses with intermediate yields of boneless retail cuts. Very thickly muscled cattle, typical of the minimum of this grade, have a high proportion of lean to bone. They are very wide through the back and loin and are uniform in width from front to rear. The back or top is nearly flat with only a slight tendency towards roundness and there is a slight break into the sides. The back and loin are very full and thick. The rounds are deep, thick, and full. The shoulders are smooth and forearms are thick and full.

- **yield grade 4** – Yield grade 4 slaughter cattle produce carcasses with moderately low yields of boneless retail cuts. Very thickly muscled cattle, typical of the minimum of this grade, have a high proportion of lean to bone. They appear wider over the top than through the shoulders or rounds. The back and loin are very thick and full, nearly flat, and break sharply into the sides. The rounds are deep, thick, and full. The shoulders are smooth and the forearms are thick and full. These cattle have a thick covering of fat over the back and rump. The flanks are very deep and full and the brisket and cod or udder are very full.

- **yield grade 5** – Yield grade 5 slaughter cattle produce carcasses with low yields of boneless retail cuts. Cattle of this grade consist of those not meeting the minimum requirements for yield grade 4 because of either more fat or less muscle or a combination of these characteristics.

- **preliminary yield grade** – The preliminary yield grade is based on the thickness of the fat over the rib eye (in inches). (Table 3)

TABLE 3

Preliminary Yield Grade Schedule

Thickness of fat over ribeye (inches)	Preliminary yield grade
0.0	2.0
0.2	2.5
0.4	3.0
0.6	3.5
0.8	4.0
1.0	4.5

- **carcass weight** – The warm-carcass weight determines the anticipated rib eye area. (Table 4)

TABLE 4

Warm Carcass Weight (pounds)[1]	Anticipated Rib Eye Area, (square inches)
500	9.8
525	10.1
550	10.4
575	10.7
600	11.0
625	11.3

[1] For each additional 25 pounds, the rib eye area increases by 0.3 square inches. A more complete table is found in Assignment Sheet 1.

- **rib eye adjustment** – The actual rib eye area is compared to the anticipated rib eye area taken from Table 4. A yield adjustment rate of 0.3 is used to modify the preliminary yield grade.

EXAMPLE: If a 600 pound carcass had an actual rib eye area of 12.5 square inches, the preliminary yield grade would be reduced by 0.45.

12.5 - 11.0 = 1.5

1.5 x .3 = .45

EXAMPLE: If a 550 pound carcass had an actual rib eye area of 9.8 square inches, the preliminary yield grade would be increased by .18.

10.4 - 9.8 = 0.6

0.6 x 0.3 = .18

- The lower the value of the yield grade, the better the value of the carcass (a yield grade of 1 is better than a yield grade of 5). Therefore, if the actual rib eye area is greater than the anticipated rib eye area, the carcass is of higher value and the preliminary yield grade is *reduced by subtracting the necessary adjustment.*

- If the actual rib eye area is less than the anticipated rib eye area, the carcass is of lower value and the preliminary yield grade is *increased by adding the necessary adjustment.*

- **kidney, pelvic, and heart fat adjustment** – The average amount of kidney, pelvic, and heart fat is 3.5%. For each 1% difference, the yield grade is adjusted by 0.2.

  EXAMPLE: If the amount of kidney, pelvic, and heart fat is 2.5%, the preliminary yield grade is decreased by 0.2.

  3.5 - 2.5 = 1.0

  1.0 x 0.2 = 0.2

  - The lower the value of the yield grade, the better the value of the carcass (a yield grade of 1 is better than a yield grade of 5). Therefore, if the actual amount of kidney, pelvic, and heart fat is greater than 3.5%, the carcass is of lower value and the preliminary yield grade will be *increased by adding the adjustment.*

  - If the actual amount of kidney, pelvic, and heart fat is less than 3.5%, the carcass is of higher value and the preliminary yield grade will be *reduced by subtracting the adjustment.*

- **Formula for calculating yield grade:**

preliminary yield grade	±	rib eye area adjustment	±	kidney, pelvic, and heart fat adjustment	=	yield grade

EXAMPLE: Determine the yield grade of a 625 pound carcass with a 0.4 inch thickness of fat over the rib eye. The carcass has 12.1 square inches of rib eye and 3.0% kidney, pelvic, and heart fat.

preliminary yield grade of 0.4 inches = 3.0

rib eye area adjustment: 12.1 - 11.3 = 0.8
0.8 x 0.3 = 0.24

fat (kidney, pelvic, and heart) adjustment:

3.5 - 3.0 = 0.5
0.5 x 0.2 = 0.1

Yield grade (using the formula): 2 average

3.0 - 0.24 - 0.1 = 2.66

☞ **NOTE:** The five yield grades are 1, 2, 3, 4, and 5. The breakdown for high, average, and low is

high	0.00 - 0.33
average	0.34 - 0.66
low	0.67 - 1.00

OBJECTIVE 6

Complete Assignment Sheet 1.

OBJECTIVE 7

Name qualifications for quality grades of cattle.

Optional Activities/Resources
- Video
- Visit a meat packing facility to examine the degrees of marbling in selected carcasses.
- Look at color photos of marbling.

WORDS YOU SHOULD KNOW	
marbling	the amount of intramuscular fat
ossification	the conversion of cartilage into bone as an animal matures
bob or bobby beef	veal from calves slaughtered when they are less than 3 weeks old

The quality grades assigned to steer, heifer, and cow carcasses are based on maturity, marbling, and muscle firmness.

- **Maturity classifications and approximate chronological age** (Table 5)

TABLE 5

Maturity Classification[1]	Approximate Chronological Age
bobby beef	less than 3 weeks
veal	3 weeks to 3 months
calf	3 to 9 months
Beef: A	9 to 30 months
B	30 to 42 months
C	42 to 72 months
D	72 to 96 months
E	more than 96 months

[1] Indicators of maturity include the size, shape, and ossification of the bones and cartilages as well as the color and texture of the cut lean surface.

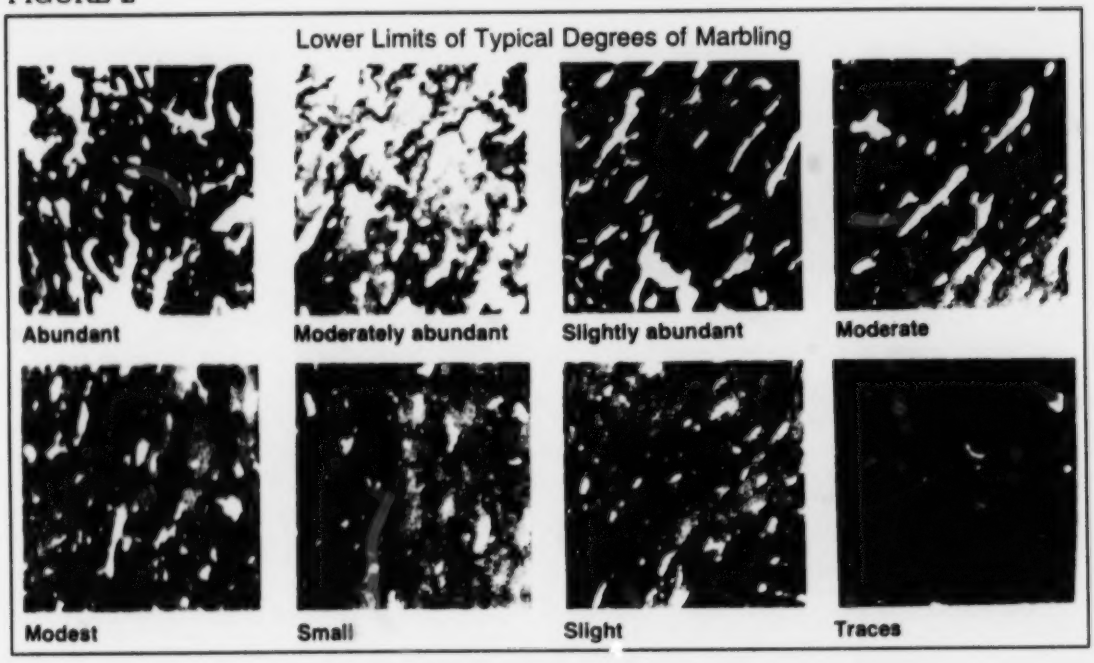
- **Ten degrees of marbling** (Figure 2)

☑ **NOTE:** Marbling is the primary determinant of the USDA quality grade.

- ☐ abundant
- ☐ moderately abundant
- ☐ slightly abundant
- ☐ moderate
- ☐ modest
- ☐ small
- ☐ slight
- ☐ traces

- practically devoid
- devoid

FIGURE 2



- **muscle firmness** – A carcass must meet the minimum firmness requirements for its maturity to qualify for a grade.
- Table 6 outlines the relationship between marbling, maturity, and carcass quality grade. The table assumes that the firmness of lean is comparably developed with the degree of marbling.

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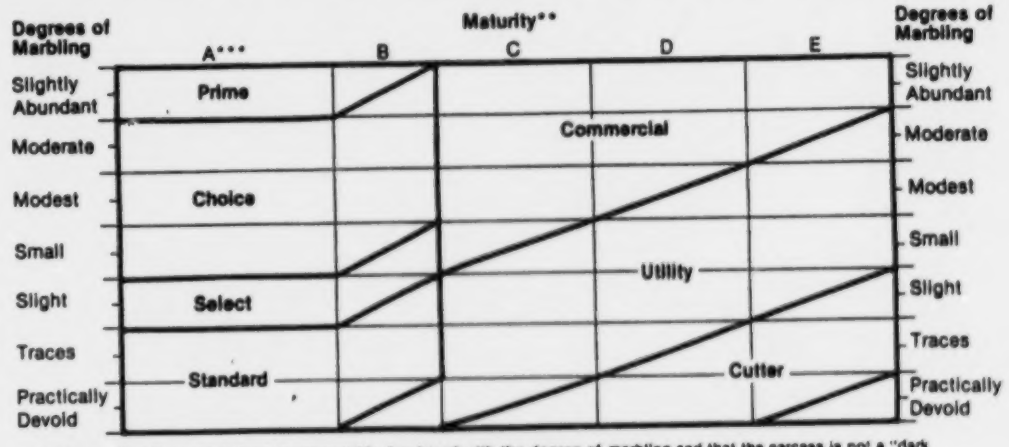
TABLE 6

Relationship Between Marbling, Maturity, and Carcass Quality Grade



*Assumes that firmness of lean is comparably developed with the degree of marbling and that the carcass is not a "dark cutter."
**Maturity increases from left to right (A through E).
***The A maturity portion of the Figure is the only portion applicable to bullock carcasses.

OBJECTIVE 8

Match slaughter grades of cattle to their descriptions.

Optional Activities/Resources
– Video

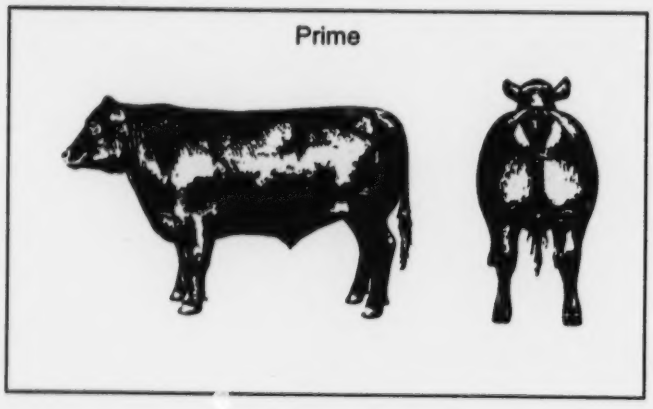
WORDS YOU SHOULD KNOW	
twist	the region between the hind legs of an animal where the thigh muscles join

Slaughter grades of cattle are determined by yield grades and quality grades. The categories of slaughter grades include:

☑ **NOTE:** Cattle are generally slaughtered around 18 months of age. Forty-two months is the approximate age limit of cattle able to qualify for the grades of Prime, Choice, Select, and Standard.

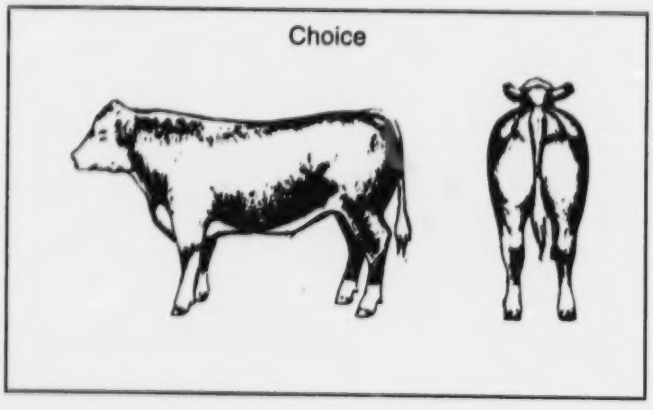
- **Prime** – Slaughter steers and heifers 30 to 42 months of age possessing the minimum qualifications for Prime have a fat covering over the crops, back, ribs, loin, and rump that tends to be thick. The brisket, flanks, and cod or udder appear full and distended and the muscling is very firm. The fat covering tends to be smooth with only slight indications of patchiness. Steers and heifers under 30 months of age have a moderately thick, but smooth covering of fat which extends over the back, ribs, loin, and rump. The brisket, flanks, and cod or udder show a marked fullness and the muscling is firm. (Figure 3)

FIGURE 3



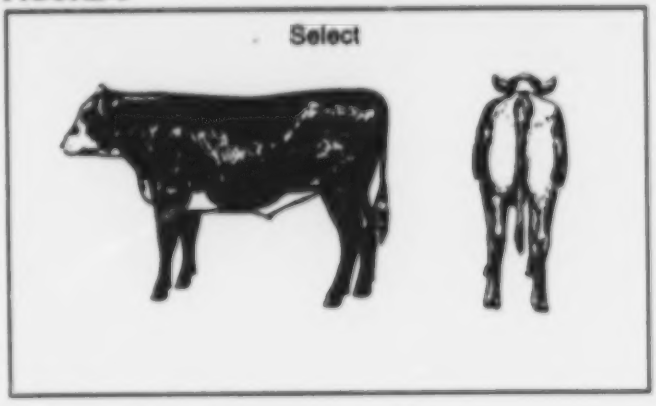
- **Choice** – Slaughter steers, heifers, and cows 30 to 42 months of age possessing the minimum qualifications for Choice have a fat covering over the crops, back, loin, rump, and ribs that tends to be moderately thick. The brisket, flanks, and cod or udder show a marked fullness and the muscling is firm. Cattle under 30 months of age carry a slightly thick fat covering over the top. The brisket, flanks, and cod or udder appear moderately full and the muscling is moderately firm. (Figure 4)

FIGURE 4



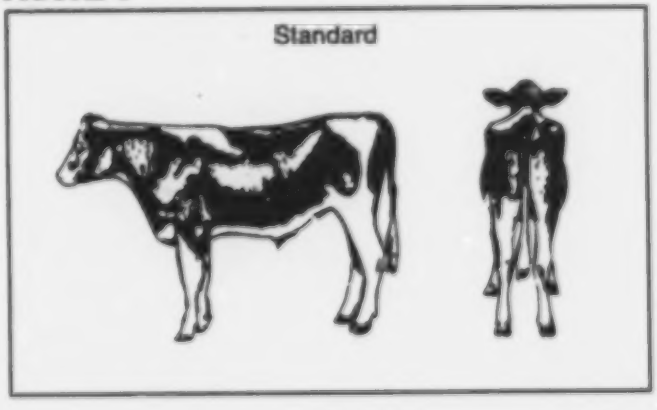
- **Select** – Slaughter steers, heifers, and cows 30 to 42 months of age possessing the minimum qualifications for Select have a fat covering that tends to be slightly thin with some fullness evident in the brisket, flanks, twist, and cod or udder and the muscling is firm. Cattle under 30 months of age have a thin fat covering which is largely restricted to the back and loin. The brisket, flanks, twist, and cod or udder are slightly full and the muscling is slightly firm. (Figure 5)

FIGURE 5



- **Standard** – Slaughter steers, heifers, and cows 30 to 42 months of age possessing the minimum qualifications for Standard have a fat covering primarily over the back, loin, and ribs which tends to be very thin. Cattle under 30 months of age have a very thin covering of fat which is largely restricted to the back, loin, and upper ribs. (Figure 6)

FIGURE 6

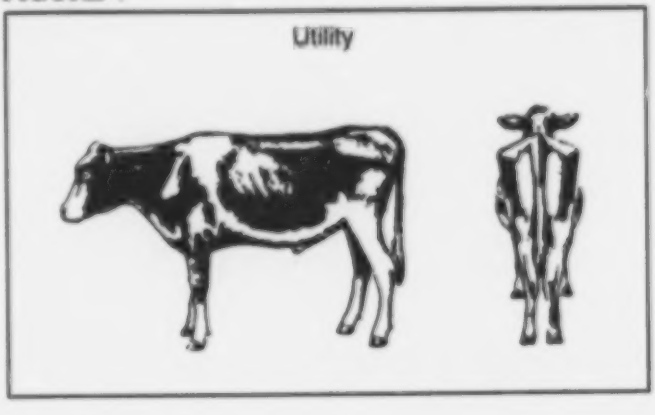


- **Commercial** – The Commercial grade is limited to steers, heifers, and cows over approximately 42 months of age. Slaughter cattle possessing the minimum qualifications for

Commercial, and which slightly exceed the minimum maturity for the Commercial grade, have a slightly thick fat covering over the back, ribs, loin, and rump and considerable patchiness frequently is evident about the tailhead. The brisket, flanks, and cod or udder appear to be moderately full and the muscle is firm.

- **Utility** – The minimum degree of finish required for slaughter steers, heifers, and cows to qualify for the Utility grade varies throughout the range of maturity permitted in this grade from a very thin covering of fat for cattle under 30 months of age to a slightly thick fat covering, generally restricted to the back, loin, and rump for the very mature cattle. The crops are slightly thin and the brisket, flanks, and cod or udder indicate very slight fullness.

FIGURE 7



- **Cutter** – In slaughter cattle in the Cutter grade, the degree of finish ranges from practically none in cattle under 30 months of age to very mature cattle having only a very thin covering of fat.

- **Canner** – Canner grade cattle are those which are inferior to the minimum specified for the Cutter grade.

OBJECTIVE 9

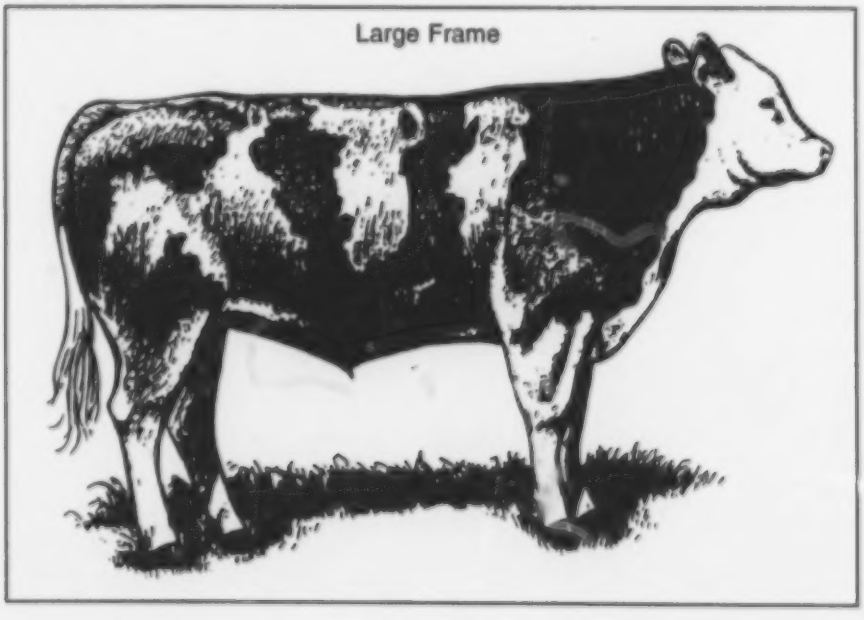
Optional Activities/Resources
- Video
- Instructor demonstrates frame size and thickness specifications on a live animal.

Select true statements about the qualifications for feeder grades of cattle.

WORDS YOU SHOULD KNOW	
gaskin	a part of the hind leg between the "knee" and the "ankle"

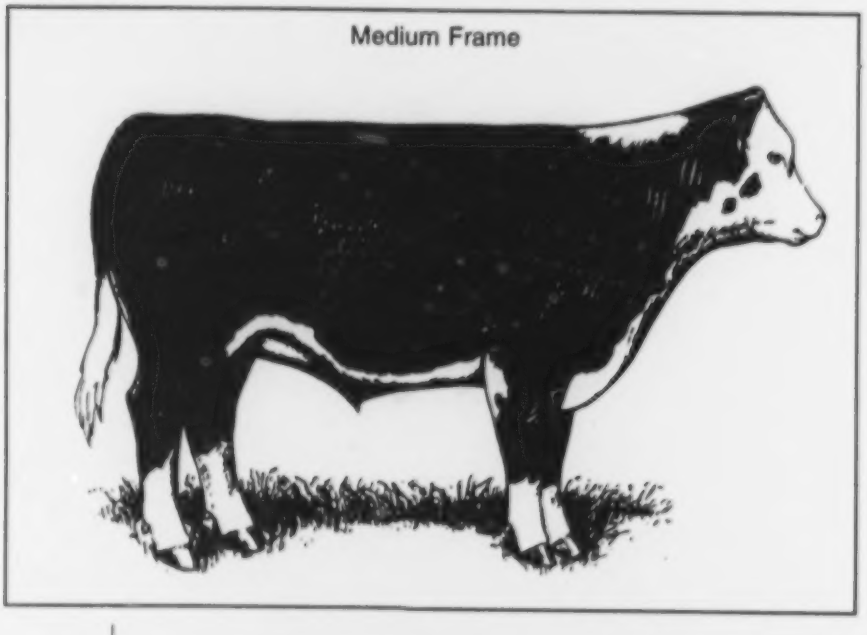
- Feeder grades are based on frame size and thickness (two of the most important genetic factors affecting value in feeder cattle).
  - **frame size** – Frame size is related to the weight at which, under normal feeding and management practices, an animal will produce a carcass of a given grade. Large-frame animals require a longer time in the feedlot to reach a given grade and will weigh more than a small-framed animal would weigh at the same grade.
  - **thickness** – Thickness is related to muscle-to-bone ratio at a given degree of fatness-to-carcass yield grade. Thicker muscled animals will have more lean meat.
- **Frame size specifications**
  - **large frame** – Feeder cattle which have typical minimum qualifications for this grade are thrifty, have large frames, and are tall and long bodied for their age. (Figure 8)

FIGURE 8



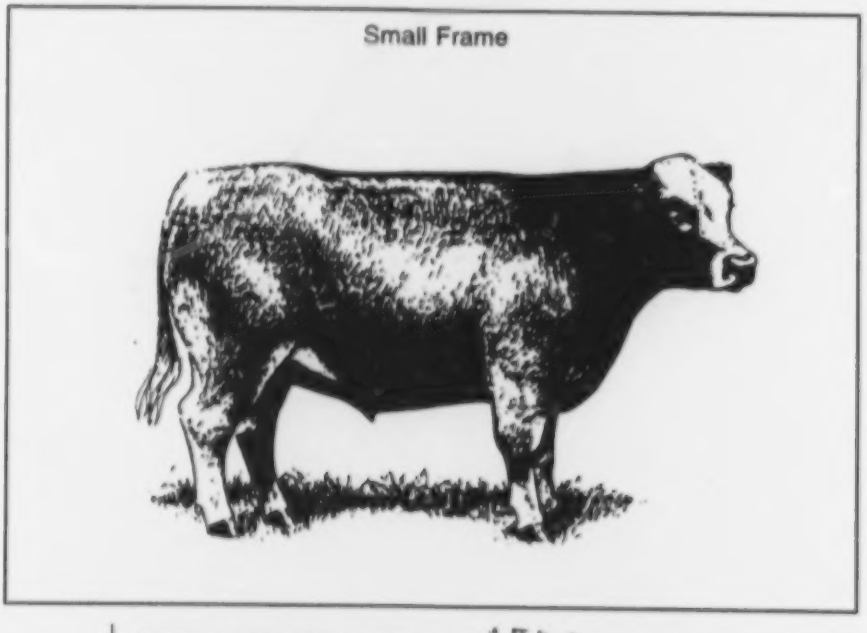
- **medium frame** – Feeder cattle that possess typical minimum qualifications for this grade are thrifty, have slightly large frames, and are slightly tall and long bodied for their age. (Figure 9)

FIGURE 9



- **small frame** – Feeder cattle in this grade are thrifty, have small frames, and are shorter bodied and not as tall as the minimum for the medium frame grade. (Figure 10)

FIGURE 10

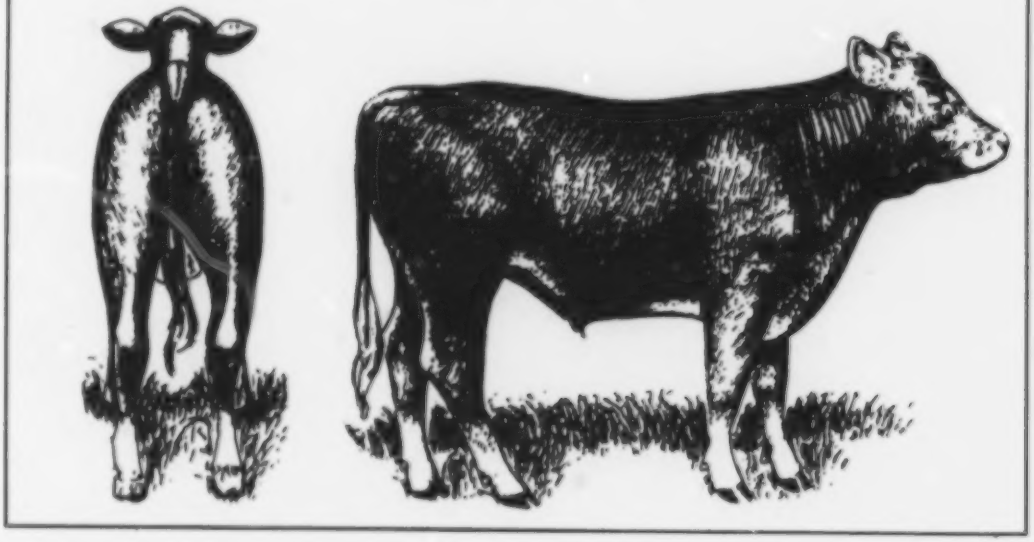


- **Thickness specifications**

  - **No. 1** – Feeder cattle which possess minimum qualifications for this grade usually show a high proportion of beef breeding. They must be thrifty and slightly thick throughout. They are slightly thick and full in the forearm and gaskin, showing a rounded appearance through the back and loin with moderate width between the legs, both front and rear. Cattle show this thickness with a slightly thin covering of fat; however, cattle eligible for this grade may carry varying degrees of fat. (Figure 11)

FIGURE 11

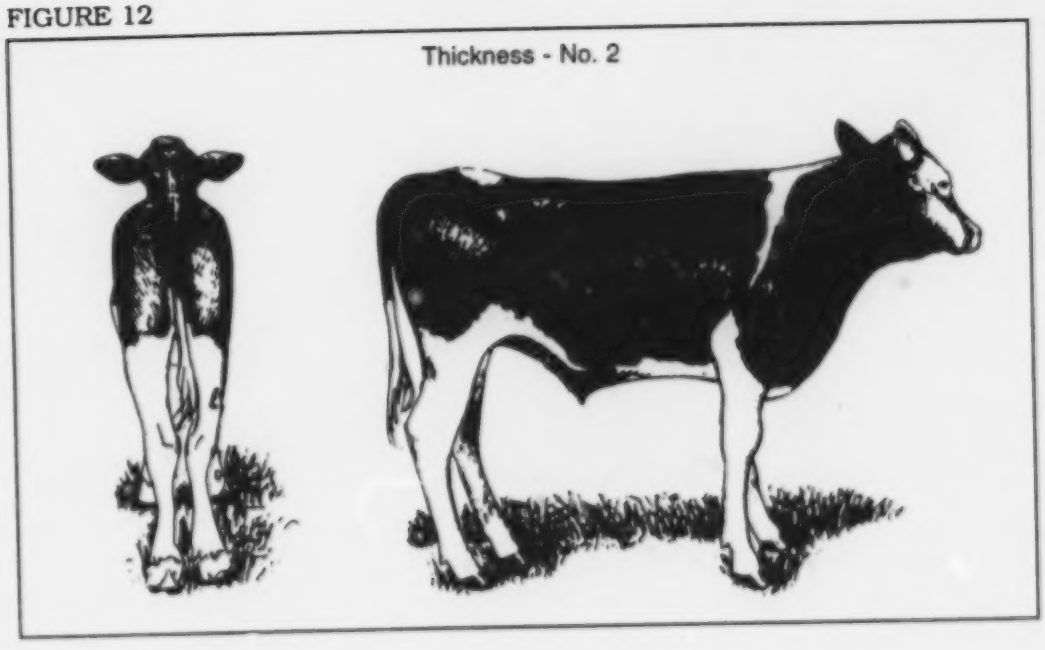
Thickness - No. 1



  - **No. 2** – Feeder cattle that possess minimum qualifications for this grade are thrifty and are narrow through the forequarter and the middle part of the rounds. The forearm and gaskin are thin and the back and loin have a sunken appearance. The legs are set close together, both front and rear. Cattle show this narrowness with a slightly

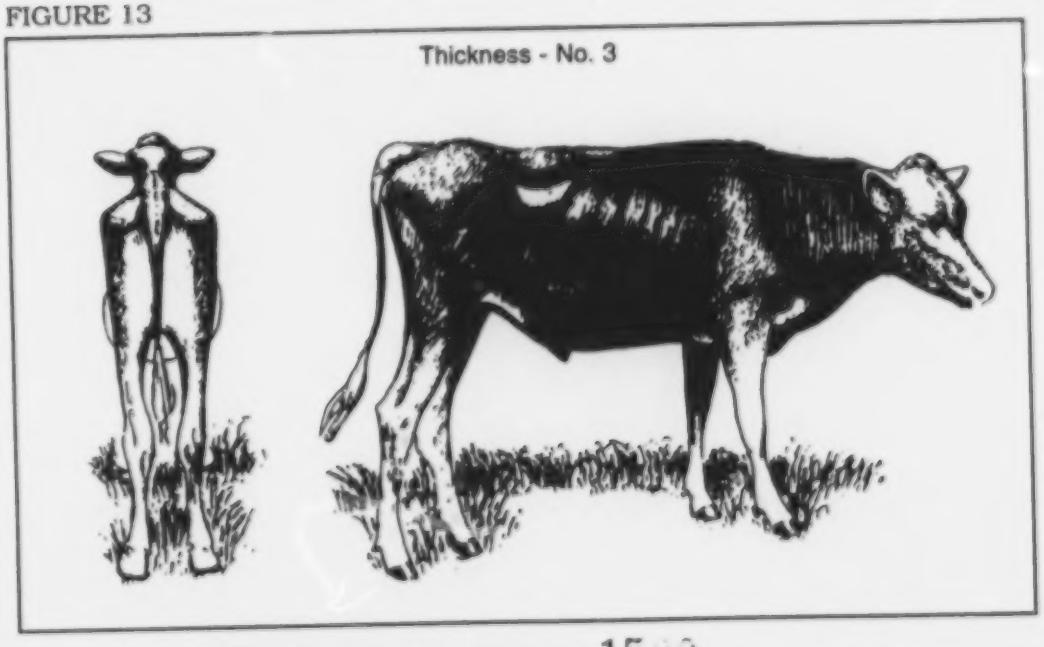
thin covering of fat; however, cattle eligible for this grade may carry varying degrees of fat. (Figure 12)

FIGURE 12



- **No. 3** – Feeder cattle included in this grade are thrifty animals which have less thickness than the minimum requirements specified for the No. 2 grade. (Figure 13)

FIGURE 13



OBJECTIVE 10

Complete Assignment Sheet 2.

OBJECTIVE 11

List factors that determine market classes of sheep.

Optional Activities/Resources
- Video
- Visit a sheep ranch and observe factors that determine market classes of sheep.

WORDS YOU SHOULD KNOW	
wether	castrated male lamb

- use
- sex (ewe, wether, ram)
- age

  ☑ **NOTE:** Age is discussed in objective 12.

- weight

OBJECTIVE 12

Match characteristics of age groups of sheep to their descriptions.

Optional Activities/Resources
- Visit a stockyard auction and compare selling prices of different age groups of sheep.
- Listen to stock reports or collect them from newspapers and chart the selling prices of sheep by age group.

- **Lambs**
  - **hothouse lamb** – a lamb that is usually less than three months of age at slaughter and that is born and marketed out of season
  - **spring lamb** – a lamb ranging in age from three to seven months that arrives to the market in the spring
  - **lamb** – any young ovine animal that does not classify as either a hothouse lamb or a spring lamb
- **Sheep**
  - **yearling sheep** – a young sheep between one and two years of age
  - **mature sheep** – a sheep more than two years of age
  - **two-year-old sheep** – a sheep between 24 and 36 months old that has its second pair of permanent incisor teeth
  - **three-year-old sheep** – a sheep between 36 and 48 months old that has its third pair of permanent incisor teeth

- **Four-year-old sheep** – a sheep between 48 and 60 months old that has a full set of permanent incisor teeth

OBJECTIVE 13

Name the criteria for slaughter grades of lamb.

Optional Activities/Resources
- Visit a meat packing facility to examine quality-indicating characteristics and cutability.

- **Quality-indicating characteristics of the lean**
  - marbling
  - texture
  - color
- **Cutability** – expected combined yield of the leg, rib, loin, shoulder, and foreshank (Table 7)

TABLE 7

Grade	Cutability (%)
1	51.0 or greater
2	49.7 to 50.9
3	48.4 to 49.6
4	47.1 to 48.3
5	47.0 or less

OBJECTIVE 14

Match slaughter grades of lamb to their descriptions.

Optional Activities/Resources
- Video
- Instructor points out characteristics of grades on live animals.
- Visit a stock show and identify market grades for lambs.

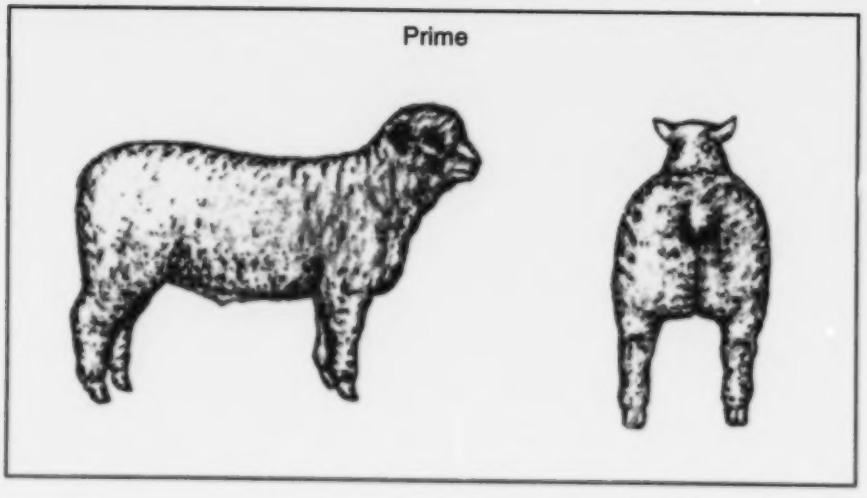
WORDS YOU SHOULD KNOW	
conformation	the amount of muscle development and the shape or proportional dimensions of an animal
finish	the amount of fat on a carcass

The five slaughter grades of lamb are based on conformation and finish.

- **Prime** – Lamb carcasses having minimum conformation qualifications of the Prime grade tend to be thickly muscled throughout, are moderately wide and thick in relation to their

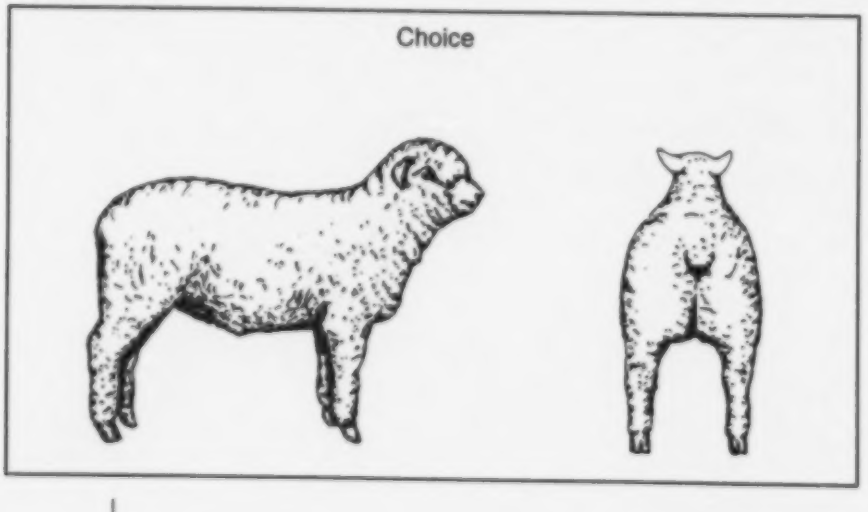
length; and have moderately plump and full legs, moderately wide and thick backs, and moderately thick and full shoulders. (Figure 14)

FIGURE 14



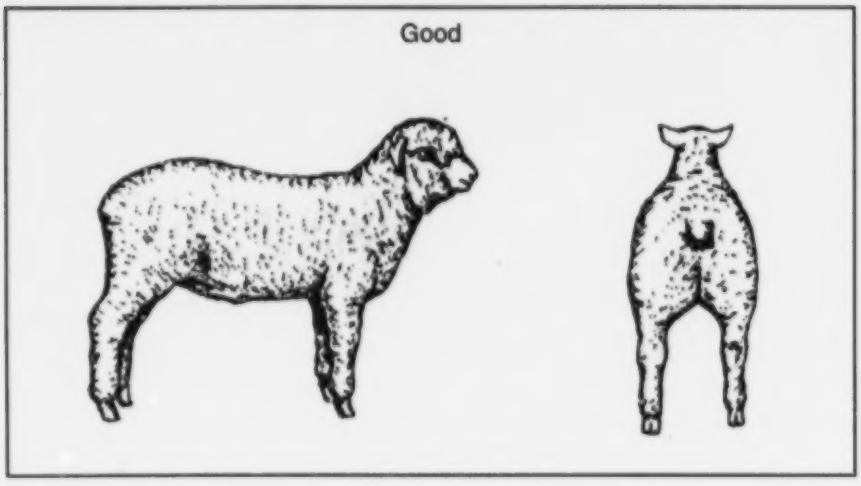
- **Choice** – Lamb carcasses having minimum conformation qualifications for the Choice grade are slightly thick muscled throughout, they tend to be slightly wide and thick in relation to their length, and tend to have slightly plump and full legs, slightly wide and thick backs, and slightly thick and full shoulders. (Figure 15)

FIGURE 15



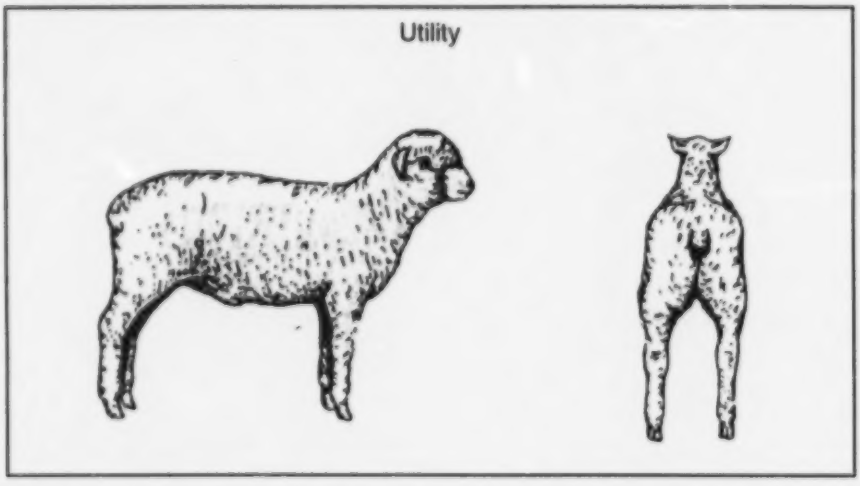
- **Good** – Lamb carcasses having the minimum conformation qualifications for the Good grade have slightly thin muscles throughout, are moderately narrow in relation to their length, and have slightly thin, tapering legs, and slightly narrow and thick backs and shoulders. (Figure 16)

FIGURE 16



- **Utility** – The Utility grade includes those lamb carcasses whose characteristics are inferior to those specified as minimum for the Good grade. (Figure 17)

FIGURE 17



OBJECTIVE 15

Optional Activities/Resources
- Instructor uses a live animal to discuss qualifications for market grades.
- Visit a swine farm and observe factors that determine market grades.

List qualifications for market grades of swine.

- weight
- conformation
- sex (boar, barrow, gilt, sow, stag)

OBJECTIVE 16

Optional Activities/Resources
- Visit a meat packing facility to examine quality-indicating characteristics of the lean and cutability.

Name the criteria for slaughter grades of swine.

- **quality-indicating characteristics of the lean**
  - firmness of the fat and lean
  - color of the lean
  - amount of feathering
  - belly thickness

  ☞ **NOTE:** Pork with extremely soft fat and/or lean; pale or dark color; or thin, soft bellies are graded U.S. Utility.

- **cutability** – expected combined yields of the four lean cuts (ham, loin, Boston butt, and picnic shoulder) (Table 8)

TABLE 8

Grade[1]	Cutability
No. 1	60.4% or greater
No. 2	57.4 to 60.3%
No. 3	54.4 to 57.3%
No. 4	54.3% or less

[1] The factors used to determine the cutability are the thickness of the fat over the last rib and the USDA muscling score (scored as thick, average, or thin).

OBJECTIVE 17

Match slaughter grades of swine to their descriptions.

Optional Activities/Resources
- Video
- Talk with a USDA extension agent about qualifications for slaughter grades of swine.
- Visit a stock show and identify slaughter grades of swine.

- **U.S. No. 1** – Barrows and gilts in this grade will produce carcasses with acceptable lean quality, acceptable belly thickness, and a high percentage of lean cuts. Swine near the borderline between the U.S. No. 1 and the U.S. No. 2 grades are thickly muscled in the hams, loins, and shoulders. The width through the ham is nearly equal to the width through the shoulders and both are wider than the back. The back is slightly full, is well-rounded, and blends smoothly into the sides. The sides are moderately long and smooth. The rear flank is slightly full and its depth is less than the depth of the fore flank. The jowls are firm, slightly thick, and full. (Figure 18)

FIGURE 18

U.S. No. 1

- **U.S. No. 2** – Slaughter barrows and gilts in this grade will produce carcasses with acceptable lean quality, acceptable belly thickness, and a slightly high percentage of lean cuts. Swine near the borderline between the U.S. No. 2 and the U.S. No. 3 grades are moderately thickly muscled in the hams, loins, and shoulders. The width through the shoulders is slightly more than the width through the hams. The back is moderately full and is slightly rounded, but with a slight

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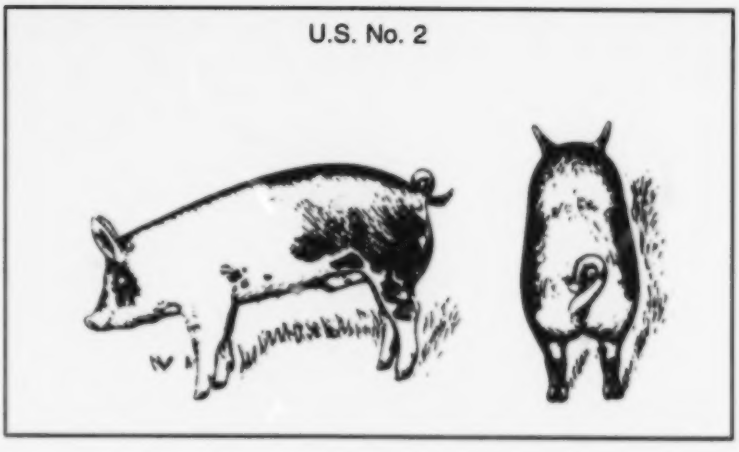
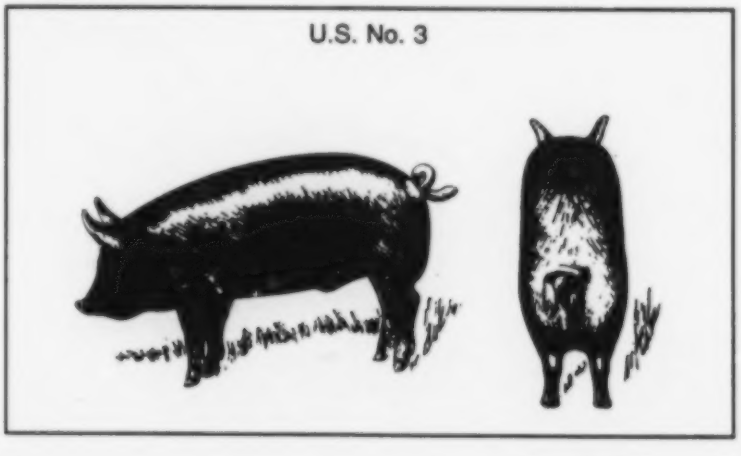
break into the sides. The sides are slightly less than the depth of the fore flank. The jowls are moderately thick and full. (Figure 19)

FIGURE 19



- **U.S. No. 3** – Slaughter barrows and gilts in this grade will produce carcasses with acceptable lean quality, acceptable belly thickness, and a slightly low percentage of the four lean cuts. Swine near the borderline between the U.S. No. 3 and the U.S. No. 4 grades are slightly thin muscled in the hams, loins, and shoulders. The width through the shoulders is definitely greater than the width through the hams. The back is full and nearly flat, with a pronounced break into the sides. The sides are short and smooth. The rear flank is full and its depth is equal to the depth of the fore flank. The jowls are thick and full. (Figure 20)

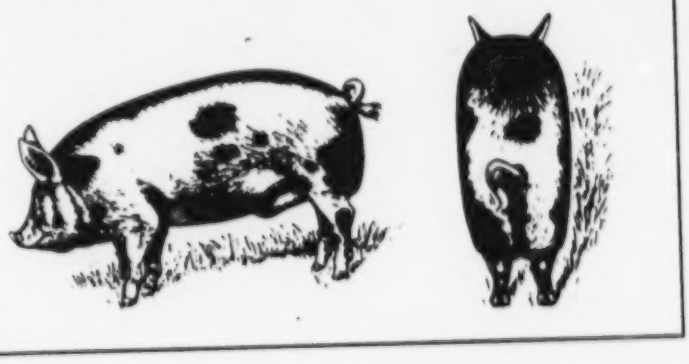
FIGURE 20



- **U.S. No. 4** – Barrows and gilts in this grade will produce carcasses with acceptable lean quality and acceptable belly thickness. However, they are fatter and less muscular and will have a lower carcass yield of the four lean cuts than those in the U.S. No. 3 grades. (Figure 21)

FIGURE 21

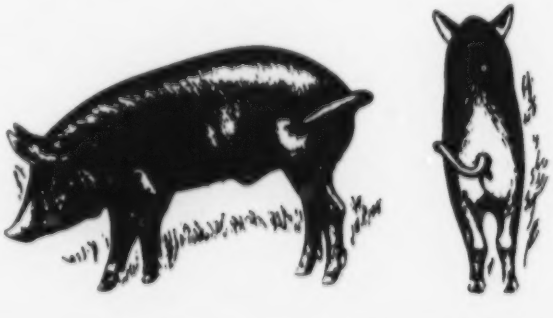
U.S. No. 4



- **U.S. Utility** – Barrows and gilts typical of this grade will have a thin covering of fat. The sides are wrinkled and the flanks are shallow and thin. Barrows and gilts in this grade will produce carcasses with unacceptable lean quality and/or unacceptable belly thickness. (Figure 22)

FIGURE 22

U.S. Utility



OBJECTIVE 18

Optional Activities/Resources
- Talk with a USDA extension agent about qualifications for feeder grades of swine.
- Visit a stock show and identify feeder grades of swine.
- Video

Match feeder grades of swine to their descriptions.

- **U.S. No. 1** – Feeder pigs in this grade near the borderline of the U.S. No. 2 grade are long and have thick muscling throughout. Thickness of muscling is particularly evident in thick and full hams and shoulders. The hams and shoulders are thicker than the back, which is well-rounded. They usually present a well-balanced appearance. In no case may a feeder pig be graded U.S. No. 1 with less than moderately thick muscling. Feeder pigs in this grade are expected to produce U.S. No. 1 grade carcasses when slaughtered between 240 and 260 pounds. (Figure 23)

FIGURE 23

U.S. No. 1

- **U.S. No. 2** – Feeder pigs in this grade near the borderline of the U.S. No. 3 grade are moderately long and have moderately thick muscling throughout. Thickness of muscling is particularly evident in moderately thick and full hams and shoulders. The back usually appears slightly full and well-rounded. They usually present a well-balanced appearance. This grade also includes feeder pigs which otherwise qualify for U.S. No. 1 grade, but have less than moderately thick

muscling. Feeder pigs in this grade are expected to produce U.S. No. 2 grade carcasses when slaughtered between 240 and 260 pounds. (Figure 24)

FIGURE 24

U.S. No. 2

- **U.S. No. 3** – Feeder pigs in this grade near the borderline of the U.S. No. 4 grade are slightly short and have slightly thin muscling throughout. The hams and shoulders are slightly thin and flat and the back usually appears moderately full and thick. Feeder pigs in this grade are expected to produce U.S. No. 3 grade carcasses when slaughtered between 240 and 260 pounds. (Figure 25)

FIGURE 25

U.S. No. 3

- **U.S. No. 4** – Feeder pigs typical of the U.S. No. 4 grade are short and have thin muscling throughout. The hams are thin and rather flat, particularly in the lower parts toward the shanks. The back usually appears slightly flat and the width across the back is greater than the width across the belly. Feeder pigs in this grade are expected to produce U.S. No. 4 grade carcasses when slaughtered between 240 and 260 pounds. (Figure 26)

FIGURE 26

U.S. No. 4

- **U.S. Utility** – Feeder pigs typical of this grade are small for their age and appear unthrifty. They often have a rough, unkempt appearance, indicating the effects of disease or poor care. The hams and shoulders usually are thin and flat and taper towards the shanks. The back is thin and lacks fullness. (Figure 27)

FIGURE 27

U.S. Utility

OBJECTIVE 19

Complete Assignment Sheet 3.

OBJECTIVE 20

Name market classes, criteria, and grades of poultry.

Optional Activities/Resources
- Video
- Talk with a poultry grader or a USDA extension agent about poultry grading.
- Go to a grocery store and compare classes of chicken in the fresh and frozen meat departments.
- Additional activities in Instructor's Guide

- **Classes of chickens** – The USDA sets standards for seven classes of live chickens:
  - **Rock Cornish hen or Cornish game hen** – a young immature chicken, five to six weeks of age, weighing no more than two pounds ready-to-cook weight, from Cornish breeding or the offspring of a Cornish chicken crossed with another breed
  - **Rock Cornish fryer, roaster, or hen** – an offspring of a cross between a purebred Cornish and a purebred Rock chicken of any carcass weight
  - **broiler or fryer** – a young chicken under 13 weeks of age, of either sex, that is tender-meated with soft, pliable, smooth-textured skin and flexible breastbone cartilage
  - **roaster or roasting chicken** – a young chicken, three to five months of age, of either sex, that is tender-meated with soft, pliable, smooth-textured skin and breastbone cartilage that is usually a little less flexible than that of a broiler or fryer
  - **capon** – a surgically unsexed male, usually under eight months of age, that is tender-meated with soft, pliable, smooth-textured skin
  - **hen, fowl, or baking or stewing chicken** – a mature female chicken, usually over ten months of age, with meat which is less tender than that of a roaster or roasting chicken and a nonflexible breastbone tip
  - **cock or rooster** – a mature male chicken with coarse skin, toughened and darkened meat, and hardened breastbone tip
- **Criteria for grading ready-to-cook poultry** – Inspection is required by law; grading is voluntary. The USDA has three grades for ready-to-cook poultry based on:
  - conformation
  - skin covering
  - fat covering

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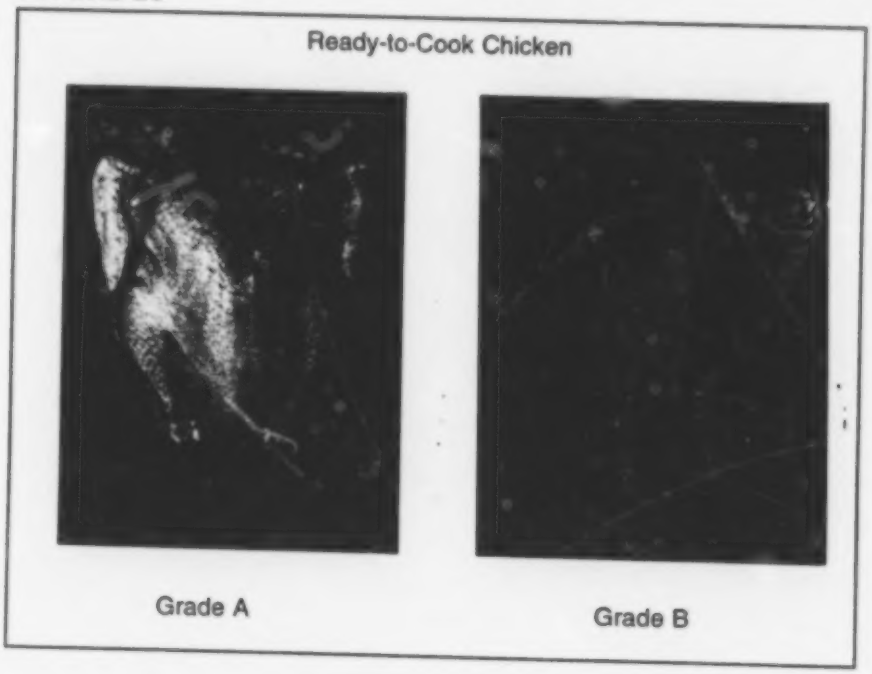
- absence of pinfeathers
- absence of tears and cuts
- absence of disjointed and broken bones
- absence of discolored skin, bruises, and blemishes

- **USDA poultry grades** (Figure 28)

  ☞ **NOTE:** A complete description of grading can be found in the *USDA Poultry Grading Manual.*

  - **Grade A** – highest quality, complete and without deformities
  - **Grade B** – moderate deformities, moderately fleshed, may be partially disjointed
  - **Grade C** – abnormal, poorly fleshed, lacking in fat, with broken bones, discolorations, and missing parts

FIGURE 28



OBJECTIVE 21

Required Activities/Resources
- Handout 3

Optional Activities/Resources
- Visit a supermarket and compare the prices of the different grades and weight classes of eggs.
- Video

Name grades, criteria, and classes of eggs.

WORDS YOU SHOULD KNOW	
air cell	the area at the large end of an egg where the inner shell membrane separates from the outer shell

Eggs are classified based on weight and grade. Standards are set by the USDA.

- **Grades** (in descending order of quality)

  ☞ **NOTE:** Handout 3 provides a chart summarizing the grading criteria. A complete description of grade requirements can be found in the *United States Standards, Grades, and Weight Classes for Shell Eggs*, which is available from the USDA.

  - AA
  - A
  - B
  - Dirty

- **Criteria for grading**
  - shell
  - air cell
  - white
  - yolk

- **Weight classes** (Table 9)

TABLE 9

Weight Class	Minimum net weight per dozen (oz)
Jumbo	30
Extra Large	27
Large	24
Medium	21
Small	18
Peewee	15

OBJECTIVE 22

Discuss marketing eggs.

Optional Activities/Resources
- Talk with a large commercial producer and a small producer about the egg market and compare methods of marketing.

WORDS YOU SHOULD KNOW	
vertical integration	the linking together of two or more steps of production, marketing, and processing

- Egg production has decreased since the early 1980's as a result of changes in consumer purchasing habits. Consumers are eating less of foods that are seen as relatively high in cholesterol, such as eggs.

- A little more than 50% of the eggs produced in the U.S. are produced under some type of vertical integration within the egg industry. Under this system, the grower does not own the birds. The grower's compensation is based on the output of the flock.

  ☞ **NOTE:** The amount of vertical integration in the broiler industry approaches 99%.

- Eggs not produced under a vertical integration contract are sold to local buyers, produce dealers, or marketed through cooperatives.

  ☞ **NOTE:** Eggs must be handled carefully. They are highly perishable and require sturdy packaging.

ASSIGNMENT SHEET 1	*MARKET GRADES AND CLASSES OF LIVESTOCK*	**D-2**

Name _____ Score _____

OBJECTIVE 6

Calculate yield grades for cattle carcasses.

EQUIPMENT AND SUPPLIES

- Handout 1, "Market Classes and Grades of Cattle"
- Calculator, if desired

INSTRUCTIONS

Calculate the yield grades for the following carcasses using the formula from objective 5, the information on Handout 1, and the examples in objective 5.

Functional Writing
- Complete forms and records

Operation and Calculation
- Calculate with decimals

Math Application
- Select/apply mathematical formula

1. A 700 lb carcass has 0.4 inches of fat over the rib eye. The rib eye area is 13.2 square inches. The percentage of kidney, pelvic, and heart fat is 2.5%.

   Yield Grade: _____

2. A 600 lb carcass has no fat over the rib eye. The rib eye area is 10.0 square inches. The percentage of kidney, pelvic, and heart fat is 2.5%.

   Yield Grade: _____

3. A 1000 lb carcass has 0.6 inches of fat over the rib eye. The rib eye area is 15.2 square inches. The percentage of kidney, pelvic, and heart fat is 2.5%.

   Yield Grade: _____

4. A 700 lb carcass has 0.4 inches of fat over the rib eye. The rib eye area is 13.2 square inches. The percentage of kidney, pelvic, and heart fat is 3.5%.

   Yield Grade: _____

5. A 900 lb carcass has 0.2 inches of fat over the rib eye. The rib eye area is 12.6 square inches. The percentage of kidney, pelvic, and heart fat is 4.5%.

   Yield Grade: _____

ASSIGNMENT SHEET 2

MARKET GRADES AND CLASSES OF LIVESTOCK

D-2

Name _____ Score _____

OBJECTIVE 10

Classify live cattle according to slaughter and feeder grades.

INSTRUCTIONS

Functional Reading
- Interpret graphics and symbols

Cognitive Activities
- Collect/record information
- Analyze/synthesize information
- Transfer knowledge/training to new situations

In this Assignment Sheet, you will observe cattle and classify them according to slaughter and feeder grades. Your instructor will identify the cattle for you to classify. Before you begin, your instructor will work through a couple of classifications with you. Study the descriptions of the different slaughter and feeder grades in objectives 7 and 8.

The key to success is practice. The more cattle you classify, the more skilled you will become.

Fill in the following blanks.

Animal #1

Feeder Grade: _____ Slaughter Grade: _____

Animal #2

Feeder Grade: _____ Slaughter Grade: _____

Animal #3

Feeder Grade: _____ Slaughter Grade: _____

Animal #4

Feeder Grade: _____ Slaughter Grade: _____

Animal #5

Feeder Grade: _____ Slaughter Grade: _____

ASSIGNMENT SHEET 3	*MARKET GRADES AND CLASSES OF LIVESTOCK*	**D-2**

Name _____ Score _____

OBJECTIVE 19

Classify swine according to slaughter grades.

EQUIPMENT AND SUPPLIES

- Handout 2, "Market Hog Evaluation Table"
- Six hogs

INSTRUCTIONS

Operation and Calculation
- Calculate with decimals

Math Application
- Select/apply mathematical formula

Data Analysis and Display
- Interpret charts and tables

Cognitive Activities
- Collect/record information
- Analyze/synthesize information
- Transfer knowledge/training to new situations

Your instructor will provide you with six hogs numbered one through six. Use the Market Hog Evaluation table to determine the grade of each hog. You should grade each hog using both methods.

Keep in mind the following rules:

Rule 1: A thick degree of muscling will compensate for 0.25 inch of last-rib backfat and a thin degree of muscling will reflect a 0.25 inch increase in last-rib backfat.

Rule 2: A minimum of **average** muscling is required for all No. 1 hogs regardless of last-rib backfat thickness.

Rule 3: All hogs with 1.75 inches or more of last-rib backfat thickness are not eligible for the No. 3 grade regardless of muscling.

Method 1: Grade calculation using muscling score

thin = 1
average = 2
thick = 3

Grade = (4 x last-rib backfat) - (1 x muscling score)

EXAMPLE:

Hog 1 has a last-rib backfat thickness of 0.9 inches and an average muscling score.

(4 x 0.9) - (1 x 2) = 3.6 - 2 = 1.6 Grade No. 1

Method 2: Grade using Percent Muscle Short-Cut

The Percent Muscle Short-Cut involves making adjustments to a "Base" hog by using the following table:

Characteristics and Adjustments for Using Percent Muscle Short-Cut to Determine Slaughter Grades		
	Base	**Increments**
Percent Muscle	54.0	
Live Weight	230.0 lbs	± 10 lbs = ± 0.15%
Loin Eye	5.0 in	± 0.2 sq.in. = ± 0.25%
Fat Depth	1.0 in	± 0.1 in. = ± 0.90%

EXAMPLE:

Hog 2 has a live weight of 250 lbs, the loin eye area is 5.4 square inches, and last-rib backfat thickness equals 0.7 inch.

Live Weight = 250 lbs - 230.0 lbs = 20 lbs (adjustment = -0.30%)

Loin Eye = 5.4 sq. in. - 5 sq. in. = 0.4 sq. in. (adjustment = +0.50%)

Fat Depth = 0.7 in. - 1.0 in. = -0.3 in. (adjustment = +2.70%)

Short-Cut: 54.0% + 0.30% + 0.50% + 2.70% = 57.5%
(Grade No. 2)

Calculate the grade for the six hogs identified by your instructor. Show your work.

Hog #1

Grade using Method 1: _____

Grade using Method 2: _____

Hog #2

Grade using Method 1: _____

Grade using Method 2: _____

Hog #3

Grade using Method 1: _____

Grade using Method 2: _____

1600

Hog #4

Grade using Method 1: _____

Grade using Method 2: _____

Hog #5

Grade using Method 1: _____

Grade using Method 2: _____

Hog #6

Grade using Method 1: _____

Grade using Method 2: _____

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OBJECTIVE SHEET

POULTRY AND EXOTIC LIVESTOCK D-3

INTRODUCTION

The poultry industry is a major agricultural industry and supplies poultry products such as meat and eggs to consumers. The poultry industry in the United States has changed dramatically over the years, from small farm flocks to large commercial enterprises which are connected with feed and processing plants.

Because of economic conditions in the agricultural field, individuals are looking for alternatives to traditional livestock. The number of individuals raising exotic and nontraditional products such as ostrich and emu or aquaculture products is increasing. Nontraditional and exotic animals are raised both for profit and in some cases as a hobby or companions.

PREREQUISITE

None

FOCUS ASSIGNMENTS

Reading Comprehension
- Gain factual information
- Analyze cause and effect
- Draw conclusions

Language
- Use standard grammar, spelling, and capitalization
- State ideas clearly

Composition
- Use complete sentences

FOCUS ASSIGNMENTS	
PREREADING:	Read the Handout "Is this Agriculture?"
WRITING:	Write a short (one paragraph to one page) discussion on the Handout. Include your opinions on why producers must carefully examine alternative agriculture operations.

UNIT OBJECTIVE

After completing this unit, you will show the following competencies by mastering the activities on the Assignment Sheets and by scoring at least 85% on the Written Test.

SPECIFIC OBJECTIVES

1. Choose the word or phrase to complete statements about poultry trends and production.
2. List types of poultry enterprises.
3. Discuss criteria for selecting poultry.
4. Select chickens for meat, egg, and breeding production. (Assignment Sheet 1)
5. Compare the cost of selected criteria for chicken and turkey production. (Assignment Sheet 2)
6. List sources for poultry.
7. Determine the number and type of chicks to order for a poultry operation. (Assignment Sheet 3)
8. Discuss poultry housing and equipment.
9. Choose the word or phrase to complete statements about poultry feed and flock health plans.
10. Discuss marketing poultry.
11. Select management practices for chickens: meat, egg, and breeding production.
12. Select management practices for turkeys.
13. Select management practices for geese and ducks.
14. State guidelines for handling eggs.
15. Choose the word or phrase to complete statements about captive game bird production.
16. Choose the word or phrase to complete statements about rabbit production.
17. Choose the word or phrase to complete statements about llama production.
18. Choose the word or phrase to complete statements about ostrich and emu production.
19. Choose the word or phrase to complete statements about beekeeping.

20. Choose the word or phrase to complete statements about aquaculture.

21. Discuss exotic animal production.

22. Discuss markets and resources for exotic animals.

23. Locate resources for one type of exotic animal production. (Assignment Sheet 4)

24. Create a brochure to promote a hypothetical poultry or exotic animal operation. (Assignment Sheet 5)

25. Research one type of exotic animal production. (Assignment Sheet 6)

26. List sources of funding and financing for exotic animal production.

INFORMATION SHEET

POULTRY AND EXOTIC LIVESTOCK **D-3**

OBJECTIVE 1

Choose the word or phrase to complete statements about poultry trends and production.

Optional Activities/ Resources
- Interview persons about poultry consumption.
- Identify retail poultry products.
- Read USDA publications.
- Read OSU publication CR-204.

WORDS YOU SHOULD KNOW	
poultry	refers to a variety of birds which have been domesticated and produce products that have economic value; the main types of poultry raised in the United States are chickens and turkeys
vertical integration	an arrangement where two or more of the steps of production, marketing, and processing are linked together

CONSUMER TRENDS

- The consumption of eggs per person has **decreased** since the late 1960s. This decline is partly because of consumer's concern about the amount of cholesterol in the diet.

  ☞ **NOTE:** New products such as egg-substitutes, often found in the freezer sections of grocery stores, are marketed to appeal to this concern.

- The consumption of poultry meat per person has **increased** significantly since the late 1960s. Consumption increased most rapidly during the 1980s. The following factors contribute to this increase:

  - Consumers view poultry meat as having a lower level of fat and cholesterol than beef or pork.
  - The price of poultry is relatively less expensive than other meat products.

    ☞ **NOTE:** Lower production costs in the poultry industry are attributed to several factors such as the biological growth and efficiency of poultry (shorter birth-to-slaughter period and higher feed-to-meat efficiency) and the vertical integration of the poultry industry.

- Further processed poultry products and ready-to-eat or convenience products such as poultry wieners, chicken nuggets, ground turkey meat, and low-fat sliced meats are contributing to the increased consumption of poultry meat.

PRODUCTION TRENDS

- The number of farms producing poultry products has decreased but the size of poultry farms has increased. The majority of poultry is raised in large commercial operations.

- The majority of poultry operations are vertically integrated, mainly with feed companies or poultry processors.

  EXAMPLE: A large company will supply the feed, chicks, etc. and the contract grower provides the housing and labor.

- The poultry industry tends to be regionalized with heavy concentrations in the Southeast.

- The poultry industry has become specialized according to what is produced, for example, eggs or meat.

- The efficiency of poultry industry has increased because of the following factors:

  - Labor requirements have decreased because of increased confinement production and increased mechanization.

  - Feed efficiency has been increased.

  - The number of eggs produced per hen per year has increased.

OBJECTIVE 2

List types of poultry enterprises.

Optional Activities/ Resources
- Read trade magazines.

WORDS YOU SHOULD KNOW	
broiler	young chickens used for meat
cockerels	male chicks
poults	refers to young turkeys
pullet	a hen less than one year old

- Egg production

  ☞ **NOTE:** In egg production operations, laying hens are kept to produce eggs. After the hens production cycle is complete, they are sold for meat.

- Broiler production

  ☞ **NOTE:** Broiler production involves raising chickens for meat.

- Foundation breeders

  ☞ **NOTE:** Foundation breeders furnish eggs to hatcheries or integrated companies.

- Hatcheries

  ☞ **NOTE:** Hatcheries furnish poults or chicks to egg production, broiler production, or market turkey operations.

OBJECTIVE 3

Discuss criteria for selecting poultry.

Optional Activities/ Resources in Instructor's Guide

WORDS YOU SHOULD KNOW	
sexed chicks	chicks which are sorted into pullets and cockerels
straight-run chicks	chicks which are about one-half pullets and one-half cockerels

- Poultry should be selected according to the use, such as laying hens or broiler production.

- Poultry should be obtained from a reputable source that is as close to the operation as possible.

  ☞ **NOTE:** The less time the poultry has to travel, the lower the possible losses.

- Determine whether straight-run chicks or sexed chicks are needed.

  EXAMPLE: Pullets would be purchased if they were needed only for egg operation; cockerels or straight-run chicks would be purchased for a broiler operation.

  ☞ **NOTE:** Sexed chicks are generally more expensive.

- Poultry may be selected according to physical appearance, pedigree, and/or family selection.

- Pullets for egg production should have the following characteristics:

  - ☐ Bright and prominent eyes
  - ☐ Large comb with good color
  - ☐ Moderately deep and broad head with a slightly flattened skull
  - ☐ Large body capacity
  - ☐ Full, soft, and pliable abdomen
  - ☐ Thin and flexible pubic bones
  - ☐ Flat and wedge-shaped shanks
  - ☐ Soft and pliable skin
  - ☐ Fully feathered
  - ☐ No specific disqualifications listed in the American Standard of Perfection

- The selection criteria for broilers is based on their market qualities after slaughter. After the broilers are slaughtered, the producer should decide if the broilers were acceptable and whether to continue receiving birds from the same source or to find a new source. In vertical integration contracts, the integrator is often responsible for the choice of chicks, the producer must take the chicks as a part of the contract for growing the birds. Although some defects may result from the slaughter process, some of the criteria may be caused by other factors such as inherited characteristics or production procedures. The areas that have to be appraised in quality determination are the following:

    - Carcass should be free of deformities that detract from its appearance or that affect the normal distribution of flesh.
    - Carcass should have a well-developed covering of flesh.
    - Carcass should have a well-developed layer of fat in the skin.
    - Carcass should be free of pinfeathers, hairs, and diminutive feathers.
    - Carcass should be free from exposed flesh resulting from cuts made during processing.
    - Carcass should be free of discolorations of the skin and flesh.
    - Carcass should be free of disjointed or broken bones.

- The selection criteria for turkeys can be based on conformation standards or reproductive traits. Reproductive traits are important if selecting turkeys for breeding stock. When selecting turkeys on the basis of conformation, seven major traits are considered:

    - Symmetry – the bird should have a broad, deep, rectangular body and desirable balance
    - Head and neck – the head should be short and broad with bright, alert eyes and a strong, curved beak; the neck should be medium-length and blend smoothly into the breast and back
    - Back and ribs – the back should be broad and relatively flat
    - Breast – should be long, broad, deep and well-rounded

- Wings – should be strong, smoothly folded, and proportionate to the body size
- Legs and thighs – should balance body, well-fleshed, feet should be large and toes should be straight
- General condition – bird should have an alert appearance, full feathers

OBJECTIVE 4

Complete Assignment Sheet 1.

OBJECTIVE 5

Complete Assignment Sheet 2.

OBJECTIVE 6

List sources for poultry.

Optional Activities/ Resources
- Visit a hatchery.
- Look at catalogs/sales information from hatcheries.

- Commercial hatcheries

  ☞ **NOTE:** Almost all of the chickens produced in the United States are supplied by commercial hatcheries. Commercial hatcheries sell day-old chicks.

- Growers which produce started pullets or ready-to-lay pullets

  ☞ **NOTE:** Started pullets are generally sold at 6-8 weeks of age and ready-to-lay pullets are sold at 16-20 weeks of age. They are generally more expensive because of the resources already invested in them.

- Commercial flock

  ☞ **NOTE:** Layers bought from a commercial flock are generally second year layers.

- Hatching chicks on the farm

OBJECTIVE 7

Complete Assignment Sheet 3.

OBJECTIVE 8

Optional Activities/ Resources
– Look at catalogs of poultry equipment.

Discuss poultry housing and equipment.

- The type of facility and equipment needed will depend on the type of poultry operation and climate.
- If planning a new poultry facility, the following criteria should be evaluated:
  - Buildings codes and regulations

    ☞ **NOTE:** The poultry facility should not be near any housing developments or planned developments.
  - Proximity to surface roads

    ☞ **NOTE:** Poultry operations depend on transportation.
  - Access to utilities and water

  ☞ **NOTE:** Factors such as existing buildings, planned expansion, neighboring houses, and wind direction must also be considered.
- Poultry facilities should meet basic requirements for housing common to any agricultural animal.
  - Well constructed
  - Provide protection
  - Sanitary and easily cleaned

    EXAMPLE: Rodent control
  - Adequate space for animals and storage
  - Attractive
  - Flexible
  - Reduce labor costs
  - Safe

    ☞ **NOTE:** The operation should have fire safety precautions and a fire emergency plan.
  - Provide for animal health needs

- Special attention should be placed on the following features for poultry housing:
  - Temperature and humidity

    ☞ **NOTE:** The ideal temperature for layers is 55° to 70° F. and for broilers, 75° F. Relative humidity should by between 50 to 75% for laying hens.

  - Insulation and vapor barrier

    ☞ **NOTE:** Proper insulation will result in more uniform temperatures. A vapor barrier can help control the moisture problem in poultry houses. The vapor barrier should be placed on the warm side or inside of the house.

  - Ventilation

    ☞ **NOTE:** Proper ventilation lets fresh air in the poultry house and allows stale air to be moved out.

  - Lighting

    ☞ **NOTE:** Lighting is critical in poultry operations because it can stimulate growth and egg-laying.

  - Sanitation

    ☞ **NOTE:** Manure removal is a major concern of poultry operations. Manure can be used as a fertilizer, soil conditioner, and as a feed for ruminants.

- The increased specialization in the poultry industry has led to highly specialized poultry operations with buildings and equipment adapted to specific uses.

- Equipment should be well constructed and easily cleaned.

  EXAMPLE: Mechanical waterers and feeders

- Large confinement operations should have an emergency warning system because of risks involved with power or equipment failure or fire or abnormal temperatures.

- The requirements for duck and geese facilities are simpler.
  - Ducks and geese prefer to be outside, although protection from extreme weather is needed.

  - Ducks and geese can be kept in a fenced in area.

FIGURE 1 SPACE REQUIREMENT FOR BIRDS

Type of Bird	Facility	Age (weeks)	Space per bird (square feet)
Commercial layers	Floor	0-4	0.30
	Floor	4-8	0.60
	Floor	9-16	1.25
	Floor	16 over	1.50
	Cage, individual	Adult	0.50
	Cage, colony	Adult	0.50
Broiler-breeder pullets	Floor	0-8	0.80
	Floor	9-16	1.30
	Floor	16 over	2.00
Broiler-breeder hens	Floor	Adult	2.50
	Slat floor	Adult	2.00
Broilers	Floor	0-4	0.30
	Floor	4-8	0.75
Roasters	Floor	0-8	0.80
	Floor	9-16	1.50
Turkey-breeders	Confinement on floor	Adult	4.50
	Confinement and range	Adult	2.50 (house plus range)
Turkey-market	Confinement on floor	0-4	1.25
	Confinement on floor	4-16	2.50
	Confinement on floor	16-29	4.00
Duck-breeders	Confinement-yard	Adult	2.50 (house plus yard)
Ducklings-market	Wire	0-3	0.50
	Floor	0-3	1.00
	Floor	3-5	1.50
	Floor	After 5	2.00
Geese	Floor	0-2	1.25
	Floor	After 2	2.50

OBJECTIVE 9

Optional Activities/ Resources
– Look at different poultry feeds.

Choose the word or phrase to complete statements about poultry feed and flock health plans.

POULTRY FEED

- The nutrition requirements of poultry depend on the species, age, and type of production.

  EXAMPLES: Chickens or turkeys, layers or meat production

- The ration must supply the necessary protein, carbohydrates, minerals, and vitamins. Water must also be provided.

- Carbohydrates, which supply energy, make up most of the poultry rations.

- The most commonly used grain in poultry rations is corn. Other grains used include oats, wheat, grain sorghum, and proso millet.

- Rations are prepared by the feed mill to meet specific requirements.

FLOCK HEALTH

- A sound preventive management program is the best way to make sure the flock stays healthy.

- A preventive management program should include:

  - Sanitation

    - Clean and disinfect the poultry house before bringing in new birds.

    - Limit visitors to the poultry house.

    - Use only clean and disinfected equipment.

    - Dispose of dead birds promptly and properly.

- Dispose of manure promptly and properly.
- Control lice and mites.

- Vaccinations
  - Vaccinations are available for certain poultry diseases.
  - Vaccination programs will vary according to the area and the flock.
  - Because some diseases are uncommon in certain areas and vaccines can stress birds, vaccination programs should be carefully planned and evaluated according to the needs of the specific operation.
- Control external and internal parasites.

  EXAMPLES: Mites and lice (external), worms (internal)
- Control disease outbreaks.
  - Check daily for signs of disease.
  - Use the services of a diagnostic laboratory to determine specific diseases.
  - Follow the recommendations of a veterinarian or laboratory for control of the disease.

- Other health problems or factors that can influence flock health are:
  - Cannibalism
    - Control cannibalism by debeaking.
  - Other problems poultry may develop include cage fatigue, fatty liver syndrome, aplastic anemia, and pendulous crop (in turkeys). The cause of pendulous crop may be irregular or overconsumption of feed or water. The exact causes of the other problems are not yet known.

OBJECTIVE 10

Optional Activities/ Resources
- Research a company involved in marketing poultry.
- Review grades and classes of poultry.

Discuss marketing poultry.

- The majority of poultry products are produced under some type of vertical integration contract.

  ☑ **NOTE:** Because of vertical integration contracts, few sales of live birds occur. The birds are owned by the integrator rather than the farmer.

- Almost all broilers are produced under vertical integration and over one-half of eggs are produced under vertical integration contracts.

- Poultry not under contract may be sold live, dressed (only at approved plants), or ready-to-cook. Poultry may be sold at the farm to the buyer, at auctions, to middleman such as dealers or brokers, or to processing plants.

  ☑ **NOTE:** Only a small amount of poultry is sold in this manner in the United States.

- Eggs that are not under contract may be sold to local buyers, produce dealers, marketed through cooperatives, or sold directly to consumers.

- Both live poultry and ready-to-cook (carcass) poultry have grades which are determined by USDA standards.

- Eggs have classes and grades which are determined by the USDA.

  ☑ **NOTE:** The standards do not consider the color of the egg since the color does not affect the egg's nutritive value.

- The grade of a poultry product helps to determine the market for the product.

  EXAMPLE: A broiler which has a Grade C is generally used for processing into other chicken foods.

- The price consumers pay for poultry products includes costs for items such as production, transportation, assembly, processing, and retailing.

- Poultry products are marketed in a variety of ways to appeal to the consumer.

  EXAMPLE: Whole carcasses, frozen dinners, nuggets, etc.

OBJECTIVE 11

Select management practices for chickens: meat, egg, and breeding production.

Optional Activities/ Resources
- Read poultry magazines.

MEAT

- Chickens raised for meat production are usually kept in confinement.
- Broilers are generally marketed between 6 and 8 weeks of age, weighing 4 to 4.5 pounds.
- A practical program for raising broilers is the all-in, all-out system, meaning that only one age of broilers is on the farm at a time.
- The broiler operation should be isolated.
- Keep accurate records of the operation.

EGG

- Clean and disinfect houses before moving pullets into them.
- Laying flocks may be housed in open-floor systems or in caged systems.
- Lighting is essential for laying flocks.
- Provide an adequate number of nests and keep the nests clean.
- Cull unproductive and inferior pullets.
- Keep accurate records of the operation.

BREEDING

- Vaccination programs and blood-testing must be done on breeding flocks.
- Breeding flocks consist of about 10% as many males as females.

- Management practices will vary according to the purpose of the breeding operation.

  EXAMPLE: Pullets for laying, broilers

- Keep accurate records of the operation.

OBJECTIVE 12

Select management practices for turkeys.

Optional Activities/ Resources
- Read journals.
- Write to the National Turkey Federation.

- Thoroughly clean and disinfect the brooder house before the poults arrive.

- Spread fresh litter on the floor; litter should be covered with rough-surfaced paper the first few days.

  ☞ **NOTE:** Shavings, rice hulls, chopped straw, peat moss, and other commercial litters may be used. Litter should be covered with rough paper the first few days to keep the poults from eating it.

- Poults should be encouraged to eat and drink.

- Temperature should be kept at 95° F. for about the first two weeks and then lowered 5° F. each week until heat is no longer needed.

- Brooder guards should be used the first week to keep poults near the heat source.

- Provide ventilation without drafts.

- Clean feeders and waterers regularly.

- Poults may be moved to confinement houses at six to eight weeks of age.

- Breeding stock should be tested for diseases.

OBJECTIVE 13

Select management practices for geese and ducks.

Optional Activities/ Resources
- Visit a facility with ducks or geese.

WORDS YOU SHOULD KNOW	
drakes	refers to male ducks
ducklings	young ducks
ducks or duck hens	refers to female ducks
gander	refers to geese which are male
goose	refers to geese which are female
gosling	young geese

- The amount of space and type of facility required for geese and ducks depends on the objectives of the operation.
- Fresh water which is easily accessible should be available at all times.
- Geese must have access to pasture.
- Ducks can be raised in confinement or in a growing house which has an exercise area that includes water for swimming or wading.
- Pelleted feeds are best for ducks.
- The breed should be chosen according to the use.

  ☞ **NOTE:** The White Pekin duck is the primary duck raised for meat in the United States. The primary geese raised for meat in the United States are the Toulouse, Emden, and Pilgrim. Both ducks and geese are also raised by poultry fanciers and as a hobby, and geese are raised for weeding crops.

- Young ducklings and goslings should not be let out in the rain.

  ☞ **NOTE:** After they are well-feathered, being out in the rain is not a concern.

- Ducks and geese should be protected from predators.

- Ducklings and goslings can be brooded either naturally or artificially.
- Ducks and geese grow faster than chickens and will require heat for a shorter length of time.

  ☛ **NOTE:** Five to six weeks of brooding is generally enough.

- Ducklings can have wire or litter flooring.

  ☛ **NOTE:** Chopped straw, wood shavings, or peat moss can be used for flooring. Litter must be free of mold and must be dry.

- Litter should be used for goslings; cover the litter with rough paper the first few days.

  ☛ **NOTE:** Chopped straw, sawdust, wood shavings, crushed corn cobs, or peat moss can be used for flooring.

OBJECTIVE 14

State guidelines for handling eggs.

Optional Activities/ Resources
- Candle eggs.

WORDS YOU SHOULD KNOW	
candle	to examine an egg for freshness, blood spots, fertility, and growth by examining the egg using a high-intensity light; most eggs are mass candled using equipment

- Handle eggs carefully.

  ☛ **NOTE:** Eggs will lose quality if they are not handled carefully.

- Eggs should be kept cool and in high humidity.
- Gather eggs frequently.

  EXAMPLE: Gathering eggs 3-4 times daily

- Clean soiled eggs.

  ☛ **NOTE:** Eggs can be washed using egg-washing equipment. Wash water should always be warmer than eggs.

- Do NOT store eggs close to anything with a strong odor.

  EXAMPLES: Paint, kerosene

- Candle eggs.
- Separate eggs into weight classes.
- Properly pack eggs.
- Keep all equipment used in handling eggs clean.
- Do NOT hold eggs for more than one week.

OBJECTIVE 15

Choose the word or phrase to complete statements about captive game bird production.

Optional Activities/ Resources
– Visit a captive game bird facility.

- Game birds raised in captivity include:
  - Quail
  - Pheasants
  - Chukar partridge
  - Guinea fowl
- The Bobwhite quail is being raised in increasing numbers as a game bird for hunting preserves, for release in conservation areas, as well as for meat purposes.
  - Facilities must be constructed to minimize injuries to the quail from flying into the tops, sides, and ends of the pens.
  - A Bobwhite colony can be started in various ways: by securing adult birds, young chicks, or by hatching eggs.
  - The nutrition requirements will vary according to whether the quail will be used as breeders, birds for hunting preserves, or meat consumption.

- Chukar partridges are raised for consumption as a specialty meat item and also for hunting preserves.
    - Chukar partridges are larger than quail and weigh about 16-24 oz. Because this size is approximately one serving, they have the potential to become restaurant specialty items.
- The ring-necked pheasant and some closely related varieties are raised in captivity for hunting preserves and for specialty meat.
- Guinea fowl are raised in captivity mainly for specialty meat.
- The facilities, equipment, and feed needed to raise game birds will depend on the specific type of game bird and size of the operation.
    - Commercial game bird feed or turkey starter is often used.

OBJECTIVE 16

Choose the word or phrase to complete statements about rabbit production.

Optional Activities/ Resources
- Write to the American Rabbit Breeders Association.

WORDS YOU SHOULD KNOW	
buck	mature male rabbit generally used for breeding
doe	mature female rabbit generally used for breeding
fryer	a rabbit before the age of 12 weeks for meat consumption
rabbitry	a rabbit raising operation or the place where rabbits are kept
roaster	a mature rabbit usually 8 months or older for meat consumption

- Rabbits are raised for a variety of purposes:
    - Fur
    - Hobbies and pets

- Meat
- Research
- Show or exhibition
- Wool

- There are 41 breeds of rabbits listed with the American Rabbit Breeders Association. The breed should be chosen for the purpose.
- The major commercial purpose of rabbit raising is meat production.
  - The meat of rabbits is white, low in fat, cholesterol, and sodium.
  - The New Zealand White and Californian are the principal breeds for commercial meat production.
- Rabbits are used for research purposes in medical schools, laboratories, and hospitals.
  - The New Zealand White and Dutch rabbits are used as laboratory and research animals.
- Rabbit products are also used to produce pharmaceuticals, which may be used to produce consumer products or research products.
- Rex rabbits are raised for fur production.
- Angora rabbits are raised for wool production.
- The building and equipment necessary for the rabbitry depends on building regulations, climate, size of the rabbitry, and capital to be invested.
  - Mature rabbits should be provided with individual hutches.
  - Rabbits can be raised in small rabbitries and in large commercial operations.

- Rabbit production in the United States is limited in comparison with other animal industries. The current profitability and size of rabbit operations is limited because of the intensive labor requirements, disease problems, and unstable markets. The lack of substantial research on rabbit nutrition and a sustained effort to produce high quality breeding stock also limits the rabbit industry.

- Many rabbits are raised by part-time operators or as a hobby.

OBJECTIVE 17

Optional Activities/ Resources
- Write to the Llama Association of North America.
- Read OSU Extension Facts F-9122.

Choose the word or phrase to complete statements about llama production.

- Llamas are native to the high mountain areas of Peru and Bolivia and are found in other South American countries. In South America llamas are used for:
  - ☐ Wool production
  - ☐ Labor
  - ☐ Food source
- Llamas are a member of the camel family.
- In the United States, llamas are used for:
  - ☐ Breeding
  - ☐ Cart pulling
  - ☐ Hobby or pet
  - ☐ Pack animals
  - ☐ Show or exhibition
  - ☐ Wool production
- Llamas are herd animals and will thrive better if placed with other llamas.
- Llamas eat grain and grass and will do well on pasture grass and hay. Llamas need a trace mineral salt block and clean water available. Alfalfa hay and dry mixed feeds are also fed to llamas.

- Llamas should have a secure fence and some type of shelter for protection from extreme weather.
- Llama reproduction has the following characteristics:
  - Female llamas can be safely bred at two years of age.
  - Normal gestation for llamas is 335 to 355 days.
  - Male llamas not used for breeding are often neutered.
  - Llamas are weaned at five to six months of age.

☛ **NOTE:** There are around 40,000 to 50,000 llamas in the United States today.

OBJECTIVE 18

Choose the word or phrase to complete statements about ostrich and emu production.

Optional Activities/ Resources
- Read OSU Extension Facts F-3988.
- Read ostrich and emu magazines.
- Visit an ostrich or emu operation.

- Ostrich and emu production in the United States is a relatively new agricultural enterprise.
- The marketing of ostrich and emu chicks is primarily for **breeding stock** because of the expense. The industries that ostrich and emu production can provide products for include:
  - Fashion industry

    EXAMPLE: Ostrich feathers
  - Leather industry

    EXAMPLE: Ostrich boots
  - Meat industry
    - Currently, the cost of ostrich and emu prohibits the meat industry from being a viable market for producers.
    - The future may bring increased opportunity for the meat market.
    - Ostrich and emu meat is a red meat which is low in fat and cholesterol.
    - The slaughter process would yield by-products such as the hide and feathers which are in demand.

- The facility and feed requirements for ostrich and emu production will vary according to the breeder. General guidelines include:
  - A sturdy, high fence
  - Approximately ½ acre per breeding pair
  - Sheltered area
  - A high quality diet

    ☑ **NOTE:** Ostriches and emus are grazers. Commercial ratite feed is available or breeders may wish to mix their own rations.
  - Provide general maintenance such as worming

OBJECTIVE 19

Choose the word or phrase to complete statements about beekeeping.

Optional Activities/ Resources
- Write to the American Honey Producers Association.
- Read journals on beekeeping.
- Visit a beekeeping operation.

WORDS YOU SHOULD KNOW	
drone	male bee that develops from an unfertilized egg
queen bee	female bee that develops from a fertilized egg and is capable of laying eggs
worker bee	female bee that develops from a fertilized egg but is not capable of laying eggs

- The primary product of beekeeping is honey.
  - Honey is served as a spread or added to other foods as a sweetener.
  - Honey is used in the commercial manufacture of food products.

    EXAMPLE: As a coating on nuts or breakfast cereal
  - Honey is used in medicine, pharmacy, and cosmetic products.

    EXAMPLE: Cough syrups

- Honey bees also manufacture substances such as beeswax, bee pollen, bee venom, and royal jelly which are important ingredients in a variety of products.

- Commercial beekeepers earn their livelihood from the sale of honey and other bee products. Beekeepers may also rent hives for pollination.

  - Honey bees unintentionally pollinate many cultivated crops. Plants pollinated by honey bees contribute indirectly to human diets because they are important food sources for livestock and wildlife.

- Some beekeepers specialize only in the sale of bees to other commercial or hobby beekeepers as opposed to selling bee products.

- Many beekeepers keep bees as a sideline business or as a hobby. They are not dependent upon the income from beekeeping for their livelihood.

  - They may sell their honey locally.

  - Small scale honey producers are an important part of the industry.

- The equipment needed for beekeeping will vary according to the operation. Large commercial operations will require more extensive equipment. Basic equipment includes items such as the hives, smokers, and protective clothing.

- Bees can be obtained from local beekeepers or from large bee breeders. A colony of bees is comprised of the queen bee, worker bees, and drones. The queen bee is the only reproductive and lays eggs.

- Bees should have access to an abundance of nectar-secreting and pollen-bearing plants in the near vicinity.

OBJECTIVE 20

Optional Activities/ Resources
– Read OSU Extension Facts No. 9002 and 9201.

Choose the word or phrase to complete statements about aquaculture.

WORDS YOU SHOULD KNOW	
aquaculture	the commercial raising of animals and plants that live in water
fingerling	fish from 1 inch to 8 inches long
stocker	fish 8 inches or over

- Aquaculture is an important aspect of the fish industry. Although the majority of food fishes are still obtained by the capture of wild fishes, aquaculture is becoming an important producer of food products in the United States and worldwide.
  - Aquaculturists provide American consumers with nearly all their rainbow trout, channel catfish, and crayfish, and with approximately 40 percent of the oysters they consume.
- Types of aquaculture environments include:
  - warmwater aquaculture – commercial raising of stock that thrives in warm, freshwater with temperatures between 70° F and 90° F.

    EXAMPLES: Catfish, crayfish (also called crawfish), carp, baitfish cultures, sport fishes
  - coldwater aquaculture – commercial raising of stock that thrives in cool, clear freshwater with temperatures 65° F. and under
  - mariculture – commercial raising of stock that thrives in saltwater of various temperatures; also called marine aquaculture

    EXAMPLES: Shrimp, oyster
- Types of aquaculture enterprises include:
  - food-fish production – raising fingerlings or stocker fish until they reach a specific size and weight and can be sold for human consumption

- broodfish production – raising and management of sexually mature, adult fish to produce eggs or seed stock; sold to fingerling producers
- fingerling production – raising fish used to stock food-fish and recreational ponds; requires the management of broodfish to produce young, the hatching of the eggs, and the care of the young until they reach market size
- stocker production – raising fish to meet the demand for fish larger than fingerling size that will reach market size early in the growing season; this is the least common type of enterprise and is frequently included with fingerling production
- fee-fish production/operation – raising fish to be sold to fee-fish lakes near population centers or used for stocking farm fee-fish ponds
- baitfish production – raising minnows or other small fishers used by fishermen to catch wild fishes; producers may sell to a wholesaler, may deliver the product to retailers, or may raise, haul, and retail independently
- ornamental or hobby fish production – raising and propagating a variety of species of tropical or aquarium fishes for sale to wholesalers and retailers

- Species produced through aquaculture includes the following:

MAJOR AQUACULTURE SPECIES

- Baitfishes/feeder fishes

  EXAMPLE: Minnows
- Channel catfish
- Trout and salmon

SECONDARY AQUACULTURE SPECIES

- Alligator
- Crayfish
- Frogs
- Hybrid striped bass

- Shrimp
- Sport fish
  - Bass
  - Bluegill
  - Hybrid sunfish
- Tilapia

NOTE: Other species may also be produced through aquaculture.

- The equipment needed will depend on the type of aquaculture operation.

OBJECTIVE 21

Discuss exotic animal production.

Required Activities/ Resources
– Discussion

Discuss exotic animal production.

- Exotic animal production includes the production of animals and animal products which are not common in a specific area.
- Exotic animal production is often a risky financial venture since markets are often not stable or clearly identified.
- The support systems, proven management practices, and research in health and nutrition may be limited for exotic animals.
- Exotic animal production must follow the principals of sound agricultural management such as ensuring the health of the animals and keeping accurate records.
- Exotic animal production does offer opportunities for successful operations. Exotic animals are often initially priced high and as more breeders enter the field, prices decline.

OBJECTIVE 22

Optional Activities/ Resources in Instructor's Guide

Discuss markets and resources for exotic animals.

- Markets for exotic animals are often not clearly identified. In some cases, such as the ostrich and emu, the primary market is currently for breeding stock.
- Marketing of exotic animals or animal products can be achieved by identifying and direct marketing to the consumers or retailers desiring the product.

  EXAMPLE: Some deer farms sell venison directly to restaurants.
- Advertising in journals and other sources can make consumers aware of the products. Exotic animals sold as hobby animals are often marketed in this manner.

  EXAMPLE: Llamas, African Pygmy goats
- Resources for the exotic animal producer include:
  - Associations
  - Publications and journals
  - Universities

OBJECTIVE 23

Complete Assignment Sheet 4.

OBJECTIVE 24

Complete Assignment Sheet 5.

OBJECTIVE 25

Complete Assignment Sheet 6.

OBJECTIVE 26

List sources of funding and financing for exotic animal production.

Optional Activities/ Resources in Instructor's Guide

☞ **NOTE:** Financing and funding for exotic animal production is often difficult to obtain. One strategy producers may use is to use personal funds to operate a pilot project for several years. Financial data from this operation can be used as a basis for the business plan submitted to a bank. Good record keeping and management are essential for new businesses. States may also earmark low-interest rates for certain agricultural enterprises. Check with a county extension agent and a bank for information.

- Commercial banks
- Credit associations
- Farmers Home Administration
- Federal Land Bank
- Individuals
- Insurance companies
- Small Business Administration

☞ **NOTE:** Contact a large commercial bank about Small Business Administration loans.

ASSIGNMENT SHEET 1

POULTRY AND EXOTIC LIVESTOCK D-3

Name _____ Score _____

OBJECTIVE 4

Select chickens for meat, egg, and breeding production.

EQUIPMENT AND SUPPLIES

- Poultry supply magazines
- Commercial hatchery catalogs

INSTRUCTIONS

Using poultry supply magazines, commercial hatchery catalogs, and information in objective 3 answer the following questions using a separate sheet of paper.

1. What age and type of chicken would you purchase for meat purposes? What characteristics would you look for?
2. What age and type of chicken would you purchase for laying? What characteristics would you look for?
3. What age and type of chicken would you purchase for breeding production? What characteristics would you look for?

Reading Comprehension
- Gain factual information

Research and Reference
- Select useful resources
- Locate resources
- Use magazines and newspapers

Language
- Use standard grammar, spelling, and capitalization
- State ideas clearly

Composition
- Use complete sentences

Cognitive Activities
- Analyze/synthesize information

1633

ASSIGNMENT SHEET 2

POULTRY AND EXOTIC LIVESTOCK D-3

Name _____ Score _____

OBJECTIVE 5

Compare the cost of selected criteria for chicken and turkey production.

EQUIPMENT AND SUPPLIES

- Poultry supply magazines

INSTRUCTIONS

Using poultry supply magazines and information from hatcheries, determine the cost of the initial investment (including poultry) for a small to medium sized poultry operation (less than 500 birds) of chickens and of turkeys.

Research and Reference
- Use magazines and newspapers

Functional Math
- Solve practical problems

ASSIGNMENT SHEET 3

POULTRY AND EXOTIC LIVESTOCK **D-3**

Name _____ Score _____

OBJECTIVE 7

Determine the number and type of chicks to order for a poultry operation.

EQUIPMENT AND SUPPLIES

- Poultry supply magazines
- Commercial hatchery catalogs

INSTRUCTIONS

Using information from poultry supply magazines and commercial hatchery catalogs, determine the number and type of chicks to order for various poultry operations. Your instructor will give you the different operations.

Research and Reference
- Use magazines and newspapers

Functional Math
- Solve practical problems

1635

ASSIGNMENT SHEET 4

POULTRY AND EXOTIC LIVESTOCK

D-3

Name _____ Score _____

OBJECTIVE 23

Locate resources for one type of exotic animal production.

EQUIPMENT AND SUPPLIES

- Library resources, magazines, newspapers

INSTRUCTIONS

Research and Reference
- Select useful resources
- Locate resources
- Use magazines and newspapers

PART 1

Choose one type of exotic animal production operation. You may choose an example included in the text such as ostrich and emu or llamas or come up with your own exotic animal. Suggestions are listed below:

- European fallow deer
- Water buffalo
- Miniature pot-bellied pig
- Miniature horses and donkeys
- Ferrets
- Mink
- Chinchilla

1636

PART 2

Answer the following questions.

1. Type of exotic animal

_____

2. Association

_____

3. Journal or magazine

_____

4. Books or publications (list at least two)

_____

_____

_____

5. Breeders in the area

_____

_____

6. Individuals (County Extension agents, etc.)

_____

_____

7. Other sources

_____

_____

1637

ASSIGNMENT SHEET 5

POULTRY AND EXOTIC LIVESTOCK

D-3

Name _____ Score _____

OBJECTIVE 24

Create a brochure to promote a hypothetical poultry or exotic animal operation.

EQUIPMENT AND SUPPLIES

- White or colored paper
- Colored pens or markers
- Ruler

INSTRUCTIONS

Language
- Use standard grammar, spelling, and capitalization
- State ideas clearly

Composition
- Construct graphics and symbols

Cognitive Activities
- Create a finished product

Choose a poultry or exotic animal breed and create a brochure to promote a hypothetical operation of that animal. Following are some guidelines for creating the brochure:

- Use correct spelling, grammar, and punctuation.
- Include open space so that the brochure is easy to read.
- Use artwork to catch the reader's eye.
- Make sure that the brochure conveys an accurate message to the reader.
- The goals of a brochure include: attract the attention of the reader, inform them about the product, tell them why they should purchase the product.
- Present the strong points of the operation in the brochure.
- Be sure to list important information that the reader needs to know such as the name and location of the business; you may also want to include a phone number and operating hours.

1633

ASSIGNMENT SHEET 6

POULTRY AND EXOTIC LIVESTOCK **D-3**

Name _____ Score _____

OBJECTIVE 25

Research one type of exotic animal production.

EQUIPMENT AND SUPPLIES

- Library resources, magazines, newspapers

INSTRUCTIONS

Reading Comprehension
- Gain factual information

Research and Reference
- Select useful resources
- Locate resources
- Use magazines and newspapers

Language
- Use standard grammar, spelling, and capitalization
- State ideas clearly

Composition
- Use complete sentences
- Compose reports

Oral Presentation
- Make informative presentations
- Use good speaking techniques

Part 1

Using the exotic animal you selected in objective 23, research the exotic animal production. Write a 1-2 page report on your findings. Be sure to use proper grammar, spelling, and punctuation. Include information on the following:

- Facilities and equipment required
- Capital required
- Labor required
- Markets or potential markets
- Current and expected size of the overall production of the animal

Part 2

Give a brief (2-3 minute) oral presentation on your topic. Use visual aids such as photographs or posters for your presentation. Be sure to use correct speaking techniques.

OBJECTIVE SHEET

LIVESTOCK PRICE TRENDS AND CYCLES

D-4

INTRODUCTION

Livestock price trends and cycles are determined by the overall economic condition and specific factors within the agricultural field. Both producer and consumer factors affect price trends and cycles. Livestock producers can use their knowledge of price trends and cycles to assist them in making sound management decisions.

PREREQUISITE

None

FOCUS ASSIGNMENTS

Reading Comprehension
- Gain factual information
- Analyze cause and effect
- Draw conclusions

Language
- Use standard grammar, spelling, and capitalization
- State ideas clearly

Composition
- Use complete sentences

FOCUS ASSIGNMENTS	
PREREADING:	Read *Seasonal Prices for Cattle and Feedgrains*, by Timm J. Bliss and Clement E. Ward, OSU Extension Facts No. 505 and *Seasonal Hog Prices and Profits*, by Clement E. Ward, Joseph E. Williams, and Timm J. Bliss, OSU Extension Facts No. 508.
WRITING:	Write a short essay (one paragraph to one page) describing how producers might use seasonal prices.

UNIT OBJECTIVE

After completing this unit, you will show the following competencies by mastering the activities on the Assignment Sheets and by scoring at least 85% on the Written Test.

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SPECIFIC OBJECTIVES

1. Choose the word or phrase to complete statements about livestock price trends and cycles.
2. Discuss supply and demand.
3. Select true statements about factors affecting price variations.
4. Match various types of livestock to times of the year when it would be most profitable to market and/or purchase them.
5. Compile market prices. (Assignment Sheet 1)
6. Interpret trends and cycles. (Assignment Sheet 2)
7. Determine ways in which progressive livestock producers use market changes.

INFORMATION SHEET	*LIVESTOCK PRICE TRENDS AND CYCLES*	**D-4**

OBJECTIVE 1

Choose the word or phrase to complete statements about livestock price trends and cycles.

Required Activities/ Resources
- Discussion

Optional Activities/ Resources
- Read USDA publications.
- Watch/listen to farm reports.
- Interview persons about meat consumption.
- Read OSU Extension Fact Sheets.

Discuss the question "What are livestock price trends and cycles?"

WORDS YOU SHOULD KNOW	
consumption	the quantity of a specific product that is used by consumers
demand	the quantity of a specific product purchased, at a given price and time
market share	percentage of the total product consumption (for example, meat products) for an individual product (for example, beef)
price cycle	period of time during which the price of a certain kind of livestock advances from a low point to a high point and then declines to a low point again
seasonal price index	usual price change from month to month during the year based on prices over a number of years; show the percentage relationship of a monthly average price to the average annual price, base index is 100
supply	the quantity of a specific product sold, at a given price and time
trend	the general direction or tendency of conditions or events

- There has been a general upward trend in livestock product prices since the 1960s. That trend is similar to the upward movement in most consumer prices, which is measured by the consumer price index.

  ☞ **NOTE:** Food expenditures as a percentage of total income have decreased.

- The per person consumption of red meat has decreased while the per person consumption of fish and poultry has increased.
  - Consumption of beef has declined sharply since the 1970s but still holds a large market share.
    - The retail price of beef is relatively higher than that of other meat products.
    - Production costs have increased and are higher for beef than for poultry.
  - Consumption of pork has also declined but the per capita consumption of pork has remained fairly stable over the last three decades.
    - Production costs have increased and are higher for pork than for poultry.
  - Consumption of poultry meat has increased significantly since the late 1960s.
    - Consumption increased most rapidly during the 1980s.
    - The market share of poultry meat has increased.
    - The price of poultry is relatively less expensive than other meat products.
    - The production costs for poultry are lower than for other meat products.
    - The per person consumption of eggs has decreased.
  - Consumption of lamb has decreased.
    - Lamb holds a small percentage of the total market share of meat products.

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- Consumption of fish has increased.
  - The United States aquaculture industry increased significantly throughout the 1980s.
  - Commercial catfish farming in the United States has increased rapidly since the late 1960s.

- Seasonal price patterns result from changes in production and consumption during the year.
  - Seasonal price patterns may be caused by supply characteristics of a product, demand characteristics, or a combination of supply and demand characteristics.
  - Seasonal price patterns result from production periods.

    EXAMPLE: Cattle production is somewhat seasonal because of annual breeding decisions; for example, more calves are typically born in the spring.
  - Seasonal price patterns can also result from demand.
    - Consumption of some products increases because of seasonal factors such as holidays. Demand for turkey, goose, duck, and ham increases in the fall. Demand for mutton increases in March and April.
  - Seasonal price indexes indicate the months' prices are most likely to be above or below the average annual price.

- Seasonal price patterns are not as evident as they used to be because of factors such as:
  - year-round finishing of cattle and lambs in large commercial feedlots
  - year-round farrowing of sows in confinement
  - use of light and hormones to control estrus in livestock

- Price cycles reflect the producer's response to changes in prices.
  - The cycles for various types of animals such as cattle, sheep, and swine reflect the length of time that the numbers of the specific animal may be changed to meet consumer demands.

- Price cycles were distinct until around 1970 with swine having a much shorter price cycle compared to sheep and cattle.
- Price cycles are not as significant as in previous years because of several factors:
  - Production operations for many livestock animals have increased in size.
  - Confinement production has increased.
  - There are more year-round births of livestock.

    ☛ **NOTE:** Confinement operations and increased reproductive technology, such as artificial insemination and manipulating estrus cycles, are factors in creating year-round births of livestock.
  - There is less seasonal production of livestock.

- The futures market gives an indication of the price projections of commodities.

OBJECTIVE 2

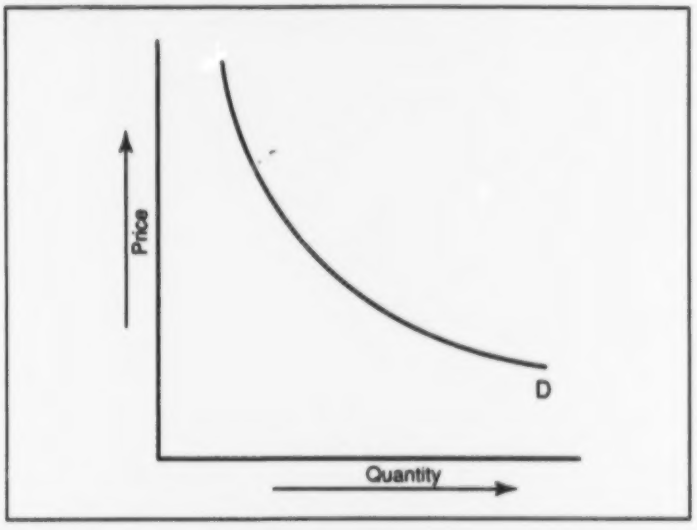
Discuss supply and demand.

Optional Activities/ Resources
- Draw demand and supply curves.
- Write a report on demand for a specific commodity.
- Give a short presentation on your report.

WORDS YOU SHOULD KNOW	
agricultural economics	the study of economic principles as they apply to the agricultural field
elasticity	refers to the variability of the quantity of a product that will be purchased at different prices
fixed costs	costs that are unavoidable and must be paid by the producer regardless of the quantity produced; for example, a land mortgage or taxes
total costs	fixed costs plus variable costs
variable costs	costs over which the producer has some control; will change with respect to quantity of product produced; for example, labor, seed, or feed

- Demand refers to the quantity of a specific product purchased, at a given price and time. Demand can be illustrated by a **demand curve**. Figure 1 shows a hypothetical demand curve for beef.

FIGURE 1



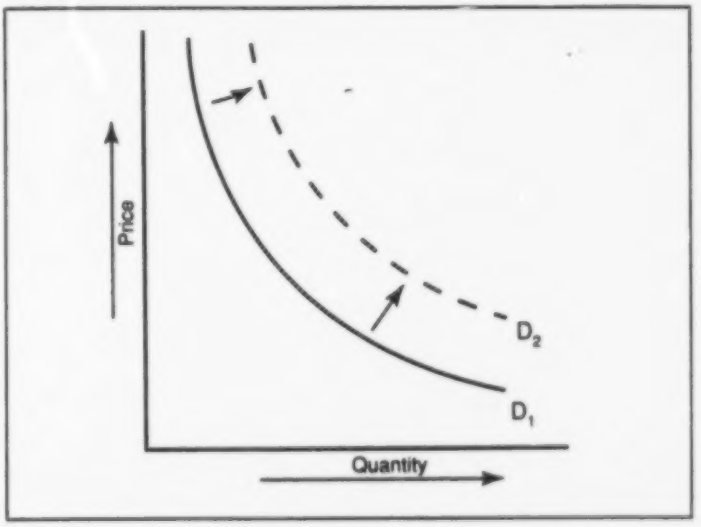
- Products have an **elastic demand** if consumers will purchase a significant difference in the amount of the product, either more or less, when the price changes.

- Products have an **inelastic demand** if consumers do not significantly vary their purchases of the product when the price changes.

  EXAMPLE: The amount of wheat products (bread, cereals, etc.) purchased does not vary a great deal with price changes; however, the amount of beef purchased varies significantly with price changes.

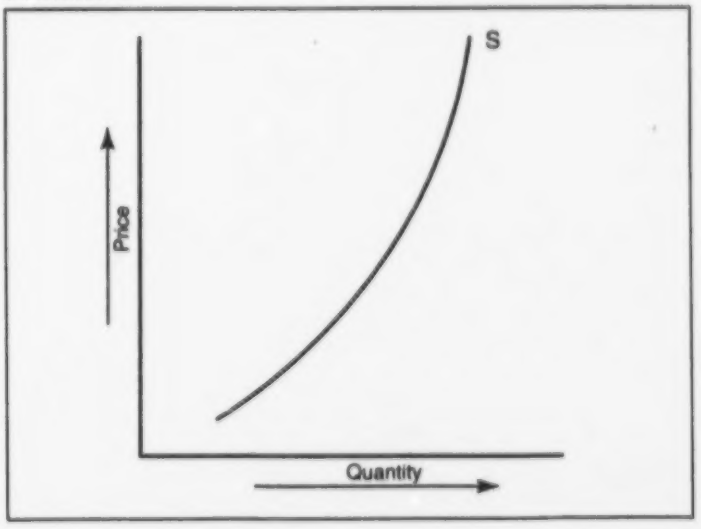
- The demand curve can shift in response to consumer's changing attitudes about a specific product, changes in the availability or price of competing products, or reductions in personal income. Changing attitudes may be caused by health concerns of a product, advertising campaigns, etc. Figure 2 illustrates a hypothetical shift in the demand for poultry meat.

FIGURE 2



- Supply refers to the quantity of a specific product sold, at a given price and time. Supply can be illustrated by a **supply curve**. Figure 3 shows a hypothetical supply curve for cattle.

FIGURE 3



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- Many agricultural products have supply curves that are relatively inelastic because of the large investments that producers have in a specific product.

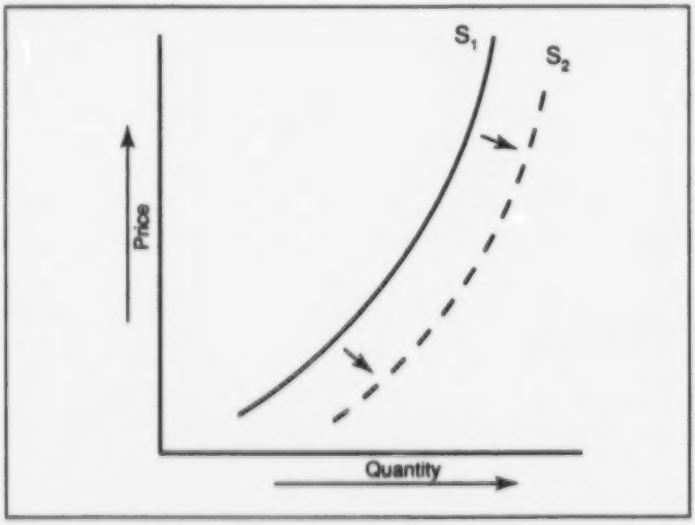
  - Producers cannot move in and out of a market easily.

    EXAMPLE: A dairy farmer has a large investment in equipment that is specific to the production of milk.

- Grain crops, specialty crops, and vegetable crops have more elastic supply curves than other agricultural products. Pig products are also more elastic because of the large litters of sows.

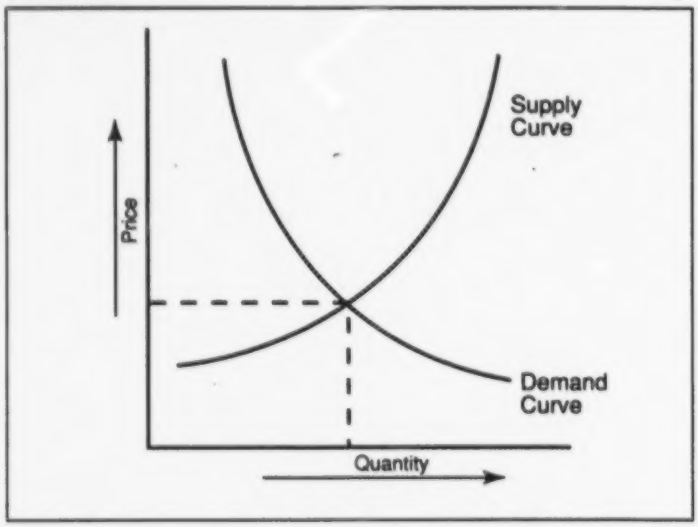
- A shift in the supply curve occurs when something happens that affects the total supply. Changes in the supply curve in agriculture are often because of weather conditions, crop failures, or "bumper crops." Figure 4 shows a hypothetical shift in the supply of wheat.

FIGURE 4



- The intersection of the supply and demand curves is the **equilibrium price**. This is the point at which buyers and sellers agree on a price. Figure 5 illustrates the equilibrium price.

FIGURE 5



- The supply of agricultural products differs from the supply of many manufactured products. Factors that affect the supply of agricultural products include:

  - Many agricultural producers have high fixed costs and, as a result, producers may be more willing to sell their products at a lower price and even below cost.

    EXAMPLE: Because of a high fixed cost of a land mortgage, a crop producer may be forced into selling the crop below cost in order to recover the fixed costs and make the mortgage payment.

  - Government-sponsored programs for certain commodities

  - Government regulations

OBJECTIVE 3

Select true statements about factors affecting price variations.

Optional Activities/ Resources in Instructor's Guide

NOTE: Price variations in livestock prices can occur for various reasons. Price variations can be long-term trends or short-term changes.

- Long-term trends are those which affect prices over a long period of time, usually caused by economic conditions.
- Cyclical trends are caused by the price cycles of livestock.
- Seasonal variations are caused by changes in production and consumption during the year.
- Neither cyclical nor seasonal variations are as evident as they used to be.
- Short-term changes are the day-to-day variations in livestock prices.
- Short-term changes are caused by the decision of large numbers of producers to sell.
- Factors that affect short-term changes include weather, transportation problems, strikes, uncertainty about government policies, and changes in the stock market.

OBJECTIVE 4

Match various types of livestock to times of the year when it would be most profitable to market and/or purchase them.

Required Activities/ Resources
- Discussion

Optional Activities/ Resources
- Read OSU Extension Fact Sheets.
- Read USDA publications.

Discuss the question "What times of the year is it most profitable to market and/or purchase livestock?"

NOTE: Historically these have been trends in livestock prices. Exceptions to these trends are not uncommon.

- Slaughter steers
  - Prime, Choice, and Good
    - Highest prices are in April and September.

- Lowest prices are in June and from October to February.

  ☛ **NOTE:** The lowest prices for the top three grades are in June because it coincides with the season of heaviest receipts. This is brought about because most feeders winter-feed and market in the late spring. The price spread between Prime and Choice is the widest from January through April.

- Other grades
  - Highest prices are from August to October.
  - Lowest prices are from December to March.

- Slaughter heifers
  - Highest prices are in January and August.
  - Lowest prices are from September through November.

    ☛ **NOTE:** Price is not influenced significantly by the price of slaughter steers. It appears that a three- to four-cent spread is always present between heifers and steers.

- Cows
  - Highest prices are from March to July.
  - Lowest prices are from October to February.

    ☛ **NOTE:** This is because of the heavy run of grass cattle in the late fall.

- Feeder calves
  - Highest prices are from March to May.
  - Lowest prices are in December.

    ☛ **NOTE:** December reflects the highest receipts, and the March to May high is reflecting demand for steers to go on grass and into feedlots. Feeder cattle receipts are greatest in the fall.

- Sheep
  - Grass-finished lambs
    - Highest prices are in May and June.
    - Lowest prices are from August to December.

      NOTE: Early lambs have price advantages. Breed ewes so lambs will come early; keep them on good spring pasture. Creep feeding is profitable.
  - Fed lambs
    - Highest prices are from February to May.
    - Lowest prices are from December to February.

      NOTE: Fed lambs are hard to market according to seasonal cycles. A feeder must buy lambs when they are available and must market them before they become too old and heavy.
  - Feeder lambs
    - Highest prices are from December to April.

      NOTE: Very few lambs are available to take advantage of this high price.
    - Lowest prices are from May through September.

      NOTE: July and August are the highest summer month prices when lambs are available.
- Swine
  - Market barrows and gilts
    - Highest prices are from June through August.

      NOTE: Take advantage of high prices by regulating farrowing dates of sows and by controlling feeding to correspond with high price markets. The consumer today normally prefers a light carcass. This is what has caused the spread between light and heavy weights.

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- Lowest markets are in November, December, March, and April.

  ☞ **NOTE:** The bulk of spring and early summer pigs farrowed are marketed in November to May. This is what normally causes the lowest prices of the year.

- Sows
  - Highest prices are in June to October.

    ☞ **NOTE:** This is brought about because of the bulk of spring farrowing. Following weaning, sows are marketed.

  - Lowest prices are in December.
- Feeder pigs
  - Highest prices are from February through April.
  - Lowest prices are in July.

OBJECTIVE 5 **Complete Assignment Sheet 1.**

OBJECTIVE 6 **Complete Assignment Sheet 2.**

OBJECTIVE 7 **Determine ways in which progressive livestock producers use market changes.**

Optional Activities/ Resources in Instructor's Guide

- Making management decisions

  EXAMPLE: Retain ownership of cattle.
- Planning buying and selling operations
- Using the futures market for risk management

ASSIGNMENT SHEET 1	*LIVESTOCK PRICE TRENDS AND CYCLES*	**D-4**

Name _____ Score _____

OBJECTIVE 5

Compile market prices.

EQUIPMENT AND SUPPLIES

- Market information on livestock

INSTRUCTIONS

Research and Reference
- Use magazines and newspapers

Functional Reading
- Follow written instructions

Data Analysis and Display
- Collect/record data

Using the market information your class has collected, compile a chart showing the following information for each time period market information was collected (for example, weekly).

- Cattle
  - ☐ Number of head
  - ☐ Slaughter steers
    - ▸ Price ranges
    - ▸ Weights
  - ☐ Slaughter heifers
    - ▸ Price ranges
    - ▸ Weights
  - ☐ Slaughter cows
    - ▸ Price ranges
  - ☐ Bulls
    - ▸ Price ranges

- Hogs
  - Number of head
  - Barrows
    - Price ranges
    - Weights
  - Sows
    - Price ranges
    - Weights
- Sheep
  - Slaughter lambs
    - Price ranges
    - Weights
  - Feeder lambs
    - Price ranges
    - Weights
- Production
  - Beef
    - Change
  - Pork
    - Change
  - Lamb, mutton
    - Change

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ASSIGNMENT SHEET 2	*LIVESTOCK PRICE TRENDS AND CYCLES*	**D-4**

Name _____ Score _____

OBJECTIVE 6

Interpret trends and cycles.

INSTRUCTIONS

Using the information gathered in Assignment Sheet 1, answer the following questions on a separate sheet of paper.

1. What weeks showed the highest and lowest prices for the following:
   - Slaughter steers
   - Slaughter heifers
   - Slaughter cows
   - Bulls
   - Barrows
   - Sows
   - Slaughter lambs
   - Feeder lambs
2. Do the prices follow traditional seasonal price patterns? Explain.
3. What is the general variation in day-to-day (short-term) changes in the market for each livestock? What could account for these short-term changes?
4. What does the production information tell you about possible trends?
5. How might a producer use the market information collected?

Research and Reference
- Use magazines and newspapers

Functional Reading
- Follow written instructions

Language
- Use standard grammar, spelling, and capitalization
- State ideas clearly

Composition
- Use complete sentences

Data Analysis and Display
- Interpret charts and tables

Cognitive Activities
- Analyze/synthesize information
- Draw conclusions